THE INSIDE STORY ON WINDOWS 95, p. 338

FEBRUARY 1995

PC Computing

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One of these babies goes down and a company can be looking at a serious productivity loss. Sometimes to the tune of $40,000 an hour. So they look to Mike to prevent that from happening. And Mike looks to Microsoft Office.

Oh, he's tried other solutions. He's even tried a proprietary computer system which, unfortunately, wasn't compatible with the systems G.E.'s customers were using. Microsoft Office, on the other hand, is. It's also more flexible and, frankly, more capable. In fact, during the first year of rollout, Mike and Microsoft Office managed to save one customer a whopping $375,000. (Imagine putting that on *your* résumé.)

The reason Mike can work miracles (and you can too) is because everything in Microsoft Office works together seamlessly. First there's Microsoft Access, the database application where every piece of information on every piece of equipment G.E. monitors is stored.

Let's say Mike wants to do a graphical trend analysis, and maybe a little bit of charting to figure out when a gasket is likely to blow. First off he hits the "Analyze It" button, which automatically turns his database table into a Microsoft Excel spreadsheet. Then he and the built-in Wizard whip up a chart.

Our next stop on the assembly line: Microsoft Word. Here Mike uses a template to draft a report warning his client about that problem gasket. If it's real serious he shoots everything over to Microsoft PowerPoint,® includes a few thermographic photos, then blazes over to the site and presents his findings right there in the van.

As a result, the machine doesn't blow a gasket. The client doesn't blow a gasket. And Mike gets to ride heroically off into the sunset.

For more on how Microsoft Office can help you take on the monsters you face, just call us at (800) 240-4782, Dept. EME. We will be glad to send you a catalog that'll help put things in perspective.

Microsoft

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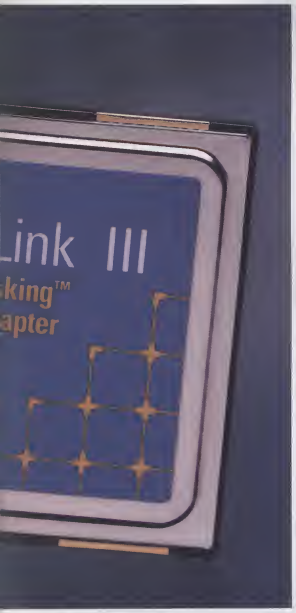

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Ultimate PCs

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How much computer can I get for the money I have to spend? That's the ultimate question most of us must ask before we go shopping in this budget-conscious age. So we asked it of more than 30 vendors by issuing a request for proposal (RFP) for high-performance and low-cost desktop systems and notebooks. The result: Great computers are only a phone call away. **136**

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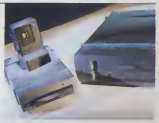

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DATABASE USABILITY FACE-OFF You have a backlog of applications you've been wanting to build. Bringing in a PC database may help solve that problem, provided it's easy for both developing applications and using them. We put five PC databases through their paces in our Usability Labs. Are they easy enough to use? And for whom?

WINDOWS 95 It's all you've been hearing about lately, but you still don't know what to expect when Windows 95 is actually released. What immediate benefits can you expect? How will your favorite applications and suites change? Which applications will arrive first? Will there be a need for utilities, shells, and communications packages? We introduce the first wave of applications, utilities, and plug-and-play hardware.

ALSO NEXT MONTH

Working Smarter You use Word for Windows and your coworkers use WordPerfect. Which file format is best for sharing documents?

Buying Smarter What's the best backup strategy for your ever-burgeoning hard disk?

Training How do you break in a new corporate standard in software? Which training method is the most effective?

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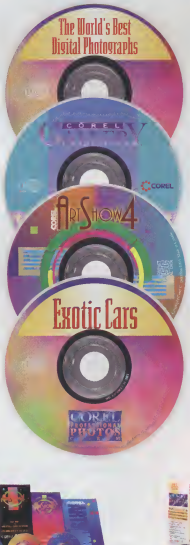

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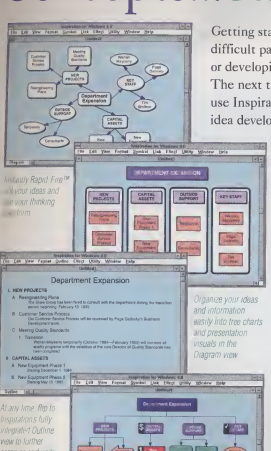

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Does the P5-100XL cause a family feud?
Will the P5-75 Family PC come between Julia and Trevor?
As the Hard Drive Turns
Sponsored by
GATEWAY 2000
Will Simone try to make the 4DX2-66 vanish with wrinkle cream?

*Furs pictured are made from artificial materials.

Setting: Lawyer's Office

Characters:
Jonathan Mattison: Lawyer
Kiki: Young widow of the deceased
Anna: Evil daughter of the deceased
Richard: Anna's wimpy husband
Victor: The deceased

Featured Gateway 2000 PC: P5-100XL with 1GB hard drive, quad-speed CD-ROM and 17" Vivitron color monitor.

We now resume our story already in progress. Victor's family has gathered for the reading of his will. While vacationing on the island of Maltase with his lovely bride Kiki, Victor slipped on the rocks and plummeted over a cliff. His body never found, Anna, Victor's power-hungry daughter, greedily bribed Mattison to read the will.

Anna: Could we get on with it? I have a 1 o'clock appointment with my plastic surgeon and I don't intend to be late.

Mr. Mattison reads the will: "I, Victor Robinson, being of sound mind and body, do hereby bequeath my Gateway 2000® P5-100XL to a woman who is very close to me. This PC's super-powered Pentium™ processor, 16MB of RAM, quad-speed CD-ROM and whopping 1GB hard drive have served me well. I successfully kept two sets of books for the sawmill with this powerful PC. With Microsoft® PowerPoint® presentation graphics program, just one of the applications in Microsoft Office Professional, and the 17-inch Vivitron™ color monitor, I created amazing slide show presentations and lured many investors into my business schemes. Because the P5-100XL is my most prized possession, it's my request that it be given to my young and spirited wife Kiki. I know she loves to dance to the heart-pounding stereo sound from the ACS-31 speakers. Kiki, at $4,299 the P5-100XL from Gateway 2000 is the best value in the PC industry. Please treat it well."

Anna: What?! I was supposed to get that system. Not that child! I've had my eyes on that P5-100XL since the day Daddy ordered it from Gateway 2000. It's Intel® 100MHz Pentium™ processor is the fastest processor available today that can still run the most popular software applications. It should be mine, not that little gold digger's! Richard! Don't be a spineless jellyfish! Make them give me the PC!

Mattison: Oh, wait Anna, here's something for you. "To my dear Anna, I leave my Yorkshire terrier, Fifi. Remember, it's a dog's life."

Anna: AAAUUUGGGHHHH!

Fifi: Ruff.

Join us next month for "As The Hard Drive Turns." Will Anna seek revenge against Kiki? Will Anna and Fifi be compatible?

intel inside pentium
IDE
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Featured Gateway 2000 PC:
The P5-75 Family PC multimedia system with 16-bit sound card and Altec speakers, TelePath II 14.4K fax/modem and six exciting Microsoft software applications.

Setting: Collapsed Office Building

Characters:
Julia: Successful Realtor
Trevor: Sexy construction worker

Trevor met Julia every afternoon in her office. Since she's married to the contractor who oversees Trevor's construction crew, it's the only way they can continue their torrid affair. But now they are trapped in her collapsed office after Mt. Eruptus exploded into a volcano causing an earthquake measuring 7.1 on the Richter scale.

Julia: Oh, Trevor, what are we going to do. I can't die! I just spent thousands of dollars on fertility treatments so we can conceive our love child after my fortieth birthday party tonight!

Trevor: Let me get this tourniquet on my severely broken arm and then I will use my brute strength to save us.

Julia: Trevor, look! There's my Gateway 2000® P5-75 Family PC™ multimedia system underneath the rubble.

Trevor: Wow! I may look like your average, sexy, suntanned, hunk construction worker, but I love PCs. You know this P5-75 Family PC multimedia system is a lot like me. It has a powerful Pentium™ processor, a massive 730MB hard drive and a 15-inch Vivitron™ monitor for stunning color images. This P5-75 will give us all the PC power we'll need for years to come. And at only $2,499, it's a great value.

Julia: Yes, and the brawn and raw vigor of this PC also reminds me of you. I can run tons of applications simultaneously. The double-speed CD-ROM, 16-bit sound card and Altec speakers give me amazing multimedia capabilities. And with the fax/modem I can order sexy little numbers from Elizabeth's Enigma for our trysts.

Trevor: That's it! We'll call the Emergency Headquarters with the modem and let them know we're here.

Julia: Oh Trevor! Do we have to? That plaster in your hair is lighting my flames of passion.

Trevor: We'll have plenty of time for love while we wait for the emergency crew. Look at this cool software. I'll use Microsoft® Works to write a letter to Mom and then I'll hit the links with MS Golf.

Julia: Trevor! What about me? This is our window of opportunity for conception!

Trevor: Just a second dear. Look at this ... .

What was Julia going to do? She couldn't lose Trevor to a PC! How humiliating! Sure it's younger and faster, but does it love Trevor like she does?"

Join us next month for "As The Hard Drive Turns." Will Julia and Trevor conceive before they're rescued? Will Trevor leave Julia for his new love — Bob?

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Gateway 2000 FamilyPC

intel inside pentium PROCESSOR

GATEWAY 2000
GATEWAY 2000

All soap opera stars portrayed by Gateway 2000 employees.

Featured Gateway 2000 PC: 4DX2-66 Family PC multimedia system with a double-speed CD-ROM, 16-bit sound card and Altec speakers, MS Works, Encarta '95, Money, Cinemania, Golf and Fine Artist.

Setting: A fancy living room in a stately home.

Characters:

Dirk: A debonair businessman

Simone: An emotionally distraught woman

Simone: Oh Dirk, I can't stand it! Our 4DX2-66 Family PC™ multimedia system from Gateway 2000® is taking over our home. It organizes the family schedule down to Jimmy's flights to Paris to see his real mother, and Sally loses all sense of time when she uses Microsoft® Fine Artist. Why only last week she was six and now she's sixteen. The family has no need for me!

Dirk: That's not true Simone. Didn't I profess my love for you by purchasing another city block of Gateville even though you're carrying my brother Rock's baby? Don't I stand by you through your bouts of schizophrenia when you think you are your sister Cheryl? The 4DX2-66 Family PC multimedia system is a productivity tool. We can use MS Money to track your pregnancy expenses so Rock will have an itemized bill, and the children can use MS Encarta™ for their homework. And most importantly we can track your daily medication with the spreadsheet and database in MS Works. Remember last year when you got your prescriptions confused. We don't want you handing out May baskets to the neighbors in nothing but your birthday suit again, now do we? Remember, this family's reputation is at stake here.

Simone: Oh Dirk, you're so good to me. I should've known you're only concerned with my well-being. The 4DX2-66 Family PC multimedia system has everything we need for multimedia including PC! graphics, double-speed CD-ROM drive, 16-bit sound card and Altec speakers. And at $1,899, we have plenty of money left for that experimental wrinkle cream I want to try!

Dirk: Yes, Simone, Gateway's 4DX2-66 is a wonderful addition to our family. We get a 30-day money-back guarantee and a three-year warranty on parts for our desktop PC and Gateway monitor. Gateway's friendly employees will provide us with technical support for the life of our PC. On-site service is available during the first year in most U.S. locations and may be provided without charge if their technicians determine it's necessary. They'll even send us a free written copy of their warranty if we request it.

Simone: Marvelous! Catch me Dirk. I love this Gateway PC so much I'm feeling faint!

Join us next month for "As The Hard Drive Turns." Will Simone hit her head on the coffee table and start to think that the Gateway 4DX2-66 is her long lost brother Charlie?

intel inside

GATEWAY 2000 FamilyPC

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- PCI Local Bus Graphics with 1MB
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- TelePath II 14.4K Fax/Modem
- 3.5" Diskette Drive
- 15" Vivitron™ Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Works, Encarta '95, Money, Cinemania '95, Fine Artist & Golf
- 3-Year Limited Parts Warranty

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P5-90 FAMILY PC

- Intel 90MHz Pentium Processor*
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- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 2MB
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- TelePath II 14.4K Fax/Modem
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
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Professional Systems

4DX2-66

- Intel 66MHz 486DX2 CPU*
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- Double-Speed CD-ROM
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- Mini Desktop Case
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- MS-DOS 6.22 & WFW 3.11
- MS Works 3.0 & Money
- 3-Year Limited Parts Warranty

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- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
- Desktop Case
- AnyKey Keyboard & Mouse
- MS-DOS 6.22 & WFW 3.11
- MS Office Professional,** Bookshelf® & Money
- 3-Year Limited Parts Warranty

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P5-75

- Intel 75MHz Pentium Processor*
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- 730MB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 1MB
- Double-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
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P5-90

- Intel 90MHz Pentium Processor*
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- 540MB 11ms IDE Hard Drive
- PCI Enhanced IDE Interface
- PCI Local Bus Graphics with 2MB
- Quad-Speed CD-ROM
- 3.5" Diskette Drive
- 15" Vivitron Color Monitor
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- MS Office Professional,** Bookshelf and Money
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P5-100XL

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- 1GB 10ms IDE Hard Drive
- PCI Enhanced IDE Interface
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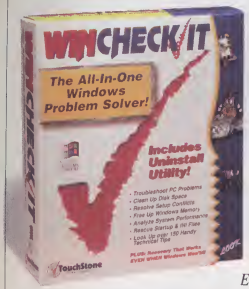

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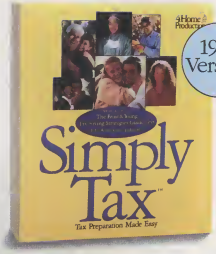

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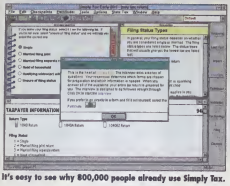

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Circle 122 on reader service card.

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Upgrades for Everyone

Your article "Upgrades that Pay" (November, page 196) is right on with our own evaluations, but we recommend upgrading to 17-inch monitors for everyone, even when the increase in productivity and payback is not significant. This creates less eyestrain and a more pleasant atmosphere, which indirectly boosts productivity. I was also pleased with Ron White's review of WordPerfect 6.1 for Windows ("More Features and You Might Get Hurt," November, page 90). He does something I wish all writers reporting on new products would do: He compares the new product with other similar products so that readers get a relative evaluation.

JACK ALLEN
PACIFIC PALISADES, CALIFORNIA

Cost-Consciousness Raising

I'm researching the cost-effectiveness of computerization and was excited to see your article on upgrades and productivity. The conclusions, however, essentially say "Number crunchers got no increase in productivity from the upgrade, but buy them a bigger monitor anyway." I had hoped to find an up-to-date source for my research, but I got an advertisement. Companies buy new computers to do something their old ones could not do. Not just because "It's cool." In the real world, the computer is a tool.

C. KEITH TESSLER
CKTO@LEHIGH.EDU

OUR TESTS SHOW that number crunchers prefer bigger monitors because they display more of the screen, ease cutting and pasting, reduce eye strain, and aid in non-spreadsheet tasks. **EL**

Perfectly Demented

Kudos and congratulations on Ron White's review of Monty Python's Complete Waste of Time ("Interactive TV," November, page 347). In all my years of working with computer software, I've never read a write-up that so perfectly captures the obvious personality of the product. The review is funny, sarcastic, pointed, and just slightly demented. It definitely makes me want to own the disc. Keep up the good work.

STEVE SCHEIBER
SCHENECTADY, NEW YORK

If It's Free, Upgrade

John C. Dvorak's opinions about upgrading in "Keep the Edge" (November, page 49) are not welcome. As a computer industry professional, he might run out and spend $1,800 on a 21-inch monitor. But for a lot of people, that money can be applied to an entire system. I see the logic that says the best tool for the job ensures the best results, but I think Dvorak has fallen prey to the evil infection known as *freebius upgradius.*

RICHARD M. CHERNOFF
FAIR LAWN, NEW JERSEY

SOHO Combo

I am purchasing a PC system for my home office. I've seen a few products that incorporate a combination of hardware capabilities into a single device—usually a fax modem and sound card offering voice mail. I haven't seen any reviews of these yet. What do you know about these kinds of products?

BARBARA HARRIS
ENCINO, CALIFORNIA

EVERY GOOD QUESTION deserves a good answer. Read our review of Boca Research's SoundExpression on page 72 in the New! section. **JOC**

It's a Paul Thing

In his November column ("Dear Santa," page 41), Paul Somerson wishes for an end to all floppy-disk software installations. That may work for those of you with rich uncles or otherwise unlimited budgets, but most of us still have kids to feed. Many small- to medium-sized businesses would agree with me: CD-ROM drives are *not* tops on our list of necessities—at least not until we all have 100MHz 486DX4s (minimum) on our desks, and healthy cash flow statements coming from accounting.

It's hard to stomach complaints about technology that I—and 99 percent of the people I know—can't afford. If I want snobbery, I'll look to Robin Leach.

PAUL GETTYS
PGETTYS@LMI.ORG

FAIR ENOUGH. If I want shortsightedness, I'll look to Paul Gettys.

Just Say Whoa!

Gil Schwartz's "I ♥ My Platform" column (November, page 51) is right on the money when he refuses to buy into the unending cycle of hardware/software/platform upgrades that the rest of the computing press touts as vital to our very survival. I have a 40MHz 386DX with 8MB of RAM, 120MB of disk space, a 14-inch monitor, mouse, fax modem, laser printer, and tape drive. I use Windows, Excel, Word, Quicken, and PC Tools because I like the multiple desktop architecture and automation facilities.

With this setup I can do most of the things I need to do in a reasonable amount of time. If Windows 95 requires a 486 and another 8MB of RAM, then I guess I just won't be upgrading until I really need to run it. Long filenames just aren't powerful enough motivation.

HERSCHEL DECOUTO
CIS: 74040,2773

Going from Scratch

Gil Schwartz's November column suggests that consumers were hostile to the idea of going from vinyl records to CDs. Gimme a break! Without question, this standard was universally accepted to replace scratchy, difficult vinyl! Has he forgotten about painstakingly cleaning records and needles, then adjusting the antiskating and tracking forces to achieve 45 minutes of snap, crackle, and pop in the music?

Big Brother may have put the item on the market, but this isn't George Orwell's novel—Big Consumer was there to freely choose. Vinyl lost, CD won.

But I agree with Schwartz's overall point: Manufacturers are always telling consumers what is good, although it's not necessarily true or to our benefit. I have been increasingly skeptical of sales pitches and try to be careful in my buying decisions—I let *PC Computing* tell me what's good!

GARY KOVACS
GARY100@AOL.COM

Oatmeal Inspiration

I was reading Gil Schwartz's November column (and agreeing whole-heartedly) when I came to a startling realization: I love that guy! I'd pay the cover price every time just to read his column. He makes me hurl my oatmeal at the wall. He also makes me jealous, see? 'Cause he's the type of writer I wish I were . . . .

RUSSELL LAUZON
TORONTO, ONTARIO

The Artist Now Known as Prince

I've finally found my prince charming—the man of my dreams. I have only one question for Mr. Schwartz: May I have your babies? (My husband is in the land of goo-goo Mac worship reading Mac magazines, so he'll never notice.) As I await your answer, I'll just sit at my PC and change the colors on my Windows desktop, as a girl in love is wont to do.

CHRISTINA HUTCHINS
ARLINGTON, TEXAS

How to Find the Index

I just received the November *PC Computing*. I noticed that a yearly index file is available, but only if you have a CompuServe account. What if you don't? Is there any other way I can get this information? Do you post files on the Internet?

PAMELA CROSSMAN
ST. JOSEPH, MICHIGAN

OUR I-WAY PATROL COLUMN discusses numerous utilities and files available on the Net. You can ftp the index.zip file from our Web edition. Or check out our new CD, the PC Computing CD-ROM Edition, which offers a year's worth of full text—including many of the files mentioned in the articles. The CD also sports a search engine that can locate the reviews, features, help tips, or products mentioned in our pages. Call (800) 537-4680 for information. **JOC**

Upbraiding or Upgrading?

Your response to Peter Kung in the November Mail section (page 23) is either inaccurate or contrary to advertising in your own magazine. *PC Computing* prints advertisements for a 286 to 486 upgrade, as well as for products designed to be placed into the socket for a 286 computer. Other publications also acknowledge the existence of these upgrades, but they're not reviewed because the older boards are too outdated to make much economic sense for upgrading.

Apparently, for most people, upgrading the CPU is followed by the need to upgrade video systems, memory, and hard drive storage, by which time you will have spent about the same for an equivalently configured new system with better performance.

JOHN A. FLAMINI
ERIE, PENNSYLVANIA

WE DON'T SET OUT to contradict our ads, but it may happen. Our editorial department is wholly independent from ads. While there's always a way to upgrade, in this case the complications outweigh the benefits. You just end up with a mess on your hands—and spend more time and money than if you just made the leap to a real 486. **AM**

The SunDisk Never Sets

In your otherwise excellent overview of PC Cards in the November issue ("Pick a Card, Any Card," page 172), you state in reference to SunDisk flash cards that "after about 400 writes, the flash chips no longer store data accurately."

That is absolutely wrong. There are no reliability or endurance issues with flash mass-storage cards. Our tests have repeatedly and conclusively shown that under normal usage, a SunDisk flash card can be used for more than 100 years with no loss or deterioration of data.

NELSON CHAN
DIRECTOR OF MARKETING, SUNDISK

WE REGRET the error. **AM**

Corrections

- In the December "Editors' Choice" feature, the price for Asymetrix's Multimedia Toolbook (page 204) should be $895. On page 215, the phone number for Toshiba's Portégé T3600CT should be (800) 334-3445.
- In our December Product Index (page 337) the company name for Views 3.1 for Windows should be Folio.
- In our November feature, "CD-ROM in Overdrive" (page 151), it should state that Optical Media's Quick Topix software also supports dual-speed CD creation.

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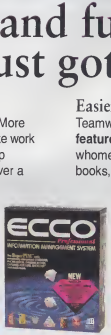

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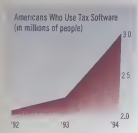
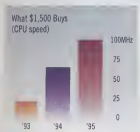
Diary of a Windows 95 Beta Tester, Infrared Cuts the



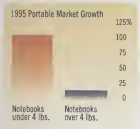
SOURCE: IRS, INTUIT

PC 1040: It's a dirty job, but everyone has to do it. That's why about 30 percent more Americans will turn to tax software this year for help with filing their income taxes.



SOURCE: IBS STRATEGIC DECISIONS

A Buck Goes Further: A devalued dollar? Not when it comes to PCs, and don't forget comparable improvements in other components as well.



SOURCE: IDC, HEWLETT-PACKARD

Shrinking PCs: Portable is fashionable, and if projected unit sales growth among different notebook computer classes is any measure, the lighter, the better.

PREVIEW

Ascent to Windows 95

Ever wonder what it's like to be a software beta tester, to be on the inside and helping to determine if a program is worthy of its ship date? More to the point, would you pay $30 for an early look at Windows 95?

It's an opportunity usually reserved for a few hundred—sometimes a few thousand—MIS types and other software insiders. But in an unprecedented beta test program, Microsoft plans to let a staggering 400,000 people preview Windows 95 on a first-come, first-served basis early this year.

Of course, even if you decide to pay the $30 shipping and handling costs for beta testing privileges, you'll still have to buy a full-price copy of Windows 95 after the preview period is over. And Microsoft still has some bugs to iron out with Windows 3.1–legacy products. So why bother?

Here's one good reason: Once you try Windows 95, you'll be knocked out. The code is solid, and you're bound to realize an immediate productivity boost. And unlike traditional beta testers, you don't have to submit bug reports. Also, you'll get more help than typical beta testers—an evaluation guide, a preliminary version of the 100-page user's guide, onscreen Wizards, and an online guided tour.

Microsoft's usability tests found that it takes experienced Windows 3.1 users about 20 minutes to "learn" Windows 95, after which they perform typical Windows tasks in 25 percent less time. We didn't run a stopwatch, but some users will find it even easier than that.

A few considerations before taking the plunge:

- Installation takes 15 minutes from the CD-ROM and an average of 45 minutes from the dozen floppies.
- The program loads into

Imminent Upgrade: Microsoft will open the Windows 95 Preview program to 400,000 people on a first-come basis.

PHOTO ILLUSTRATION BY PETER ALAN GOULD PHOTO: UNIPHOTO

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Switch video resolutions on the fly, speed Windows, and eliminate memory resource errors with the $49 AnyView Professional. Contact Binar Graphics at (415) 491-1565.
Reader Service No. 602

SURROUND SOUND
Lose yourself in multimedia with a pair of $100 AudioTower speakers. They nest easily against your monitor but won't interfere with the image. Contact NEC at (708) 860-9500.
Reader Service No. 603

WIRELESS DIAL TONE
Extend the reach of your phone jacks—wirelessly—with the tiny $99 Wireless Phone Jack System and an AC outlet. Contact Thomson Consumer Electronics at (800) 409-5111.
Reader Service No. 604

your Windows 3.1 directory, but it needs 10MB to 15MB more disk space than 3.1, for a total of 30MB.

• Installation of your application groups is automatic, but under a slightly different and far more convenient shell. Also, you don't need to reload Windows 3.1 apps.

To stay abreast of the beta tester program, subscribe to Microsoft's WinNews. Send an e-mail message to enews-@microsoft.nwnet.com that includes the words SUBSCRIBE WINNEWS. **MH**

Infrared Heats Up Wireless infrared (IR) technology for exchanging data between systems and peripherals has been around for years, but standards are finally being forged: IRDA 1 and 2. Backed by a consortium that includes Hewlett-Packard, IBM, Sharp, and others, IR ports will soon be standard issue on portables (you'll already find them on HP's OmniBook, the Sharp PC-8700 and PC-8900, and IBM's ThinkPad 755CD), as well as fax machines and other peripherals. HP is even working on a laser printer that has IR ports. Look for IR in the field, too: Nippon Telegraph and Telephone has outlined its plans to incorporate IR ports into hotel phones and public phones. **WT**

Four Times the Fun Philips LMS and Sony are at work on new quad-density CD-ROM drives that can squeeze 3GB or more of information on a single standard-sized disc. New drives to read the discs could appear on the market by the end of the year and will be backwardly compatible with the CDs available today. **WT**

Tame the Fax Flood

Faxing features will be built into Windows 95, which will make optical character recognition (OCR) a godsend. **PageKeeper 2.0** is an information omnivore, recognizing content and retrieving and cataloging files of nearly any format from any source. Its **advanced OCR engine** converts faxes and scans into an editable format. **MH**

PageKeeper 2.0 / Caere Corp. / (800) 535-7226 / $99 est. street price / *Reader Service No. 609*

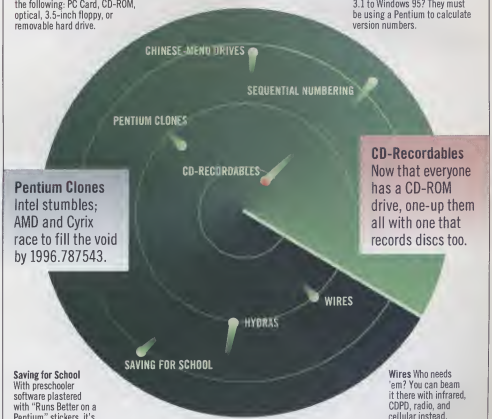
The Big Picture

What's it cost to get the big picture on Windows? As of November 23, 1994, we found four state-of-the-art displays for less than $2,000.

Product	Price
Sony GDM-20SE1 *L.A. Computer Center (310) 473-2535*	$1,799
Radius IntelliColor Display20e *Bottom Line Distribution (800) 624-9307*	$1,894
Sony GDM-20SE1 *Computer Discount Warehouse (800) 726-4239*	$1,895
Mitsubishi 21FS *O.S. Computer, (800) 938-6722*	$1,999

Reader Service Numbers: L.A. Computer Center *605*; Bottom Line Distribution *606*; Computer Discount Warehouse *607*; O.S. Computer *608*

RADAR PENTIUMS GROW ON TREES, HYDRAS ARE BACK



Chinese-Menu Drives Pick two from the following: PC Card, CD-ROM, optical, 3.5-inch floppy, or removable hard drive.

Sequential Numbering Windows 3.1 to Windows 95? They must be using a Pentium to calculate version numbers.

Pentium Clones Intel stumbles; AMD and Cyrix race to fill the void by 1996.787543.

CD-Recordables Now that everyone has a CD-ROM drive, one-up them all with one that records discs too.

Saving for School With preschooler software plastered with "Runs Better on a Pentium" stickers, it's spend now, pay later.

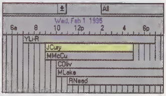
Hydras Printers that fax and photocopiers that scan—multifunction devices are back.

Wires Who needs 'em? You can beam it there with infrared, CDPD, radio, and cellular instead.

What's on the Scope? If it's near or moving toward the middle, pay attention to it. If it's moving off the screen, forget about it for now. Your time is too valuable. **WT**

Who's on First? Now You Know

Scheduling employees for **work shifts** doesn't have to be cruel recreation. With Adaptive's PeopleScheduler Plus 2.0, workers can rest assured that their **vacations** and **breaks** (and specific skills) have been dutifully logged—while managers happily track **who's late,** when they're late, and who can cover their butts. It also converts the tangle of a **customizable scheduler** to an intuitive snap-together puzzle. **TimeVisualizer** reduces schedules into drag-and-drop time-based objects (such as bars). The **Win32s version** adds predefined reports and Concentric's **R&R Report Writer 6.0 for Windows.** **JOC**



PeopleScheduler Plus 2.0 / Adaptive Software / (800) 598-1222 / $495 est. street price / *Reader Service No. 610*

Off-the-Wall Data Storage

There's more to storage than half-gigabyte hard drives and 200MB PC Cards. If you want to consider some of the less common ways to pack your bytes into hardware, take a look at these three.

For voice recording, Norris Communications' Flashback replaces the old Dictaphone with solid-state memory that records voice messages up to 30 minutes long in a removable SoundClip. One-hour SoundClips are available separately.

To record information on 2.5-inch 140MB MD Data disks, Sony has introduced a Walkman-sized battery-operated drive, the Sony MDH-10, and an internal version for ThinkPad docking stations, the Sony MDM111-A1. The disks are re-recordable and sell for $29 a pop. The drive also plays Sony's audio mini discs.

And coming down the pike for less than $1,000, the Panasonic PD drive plays CD-ROMs in both 5.25-inch and 3.5-inch sizes and records on 650MB rewritable optical disks using the same phase-changing mechanism. **ML**

Flashback / Norris Communications Corp. / (619) 679-1504 / $249 est. street price / *Reader Service No. 611*
Sony MDH-10 and MDM111-A1 / Sony Electronics / (800) 352-7669 / $699.95 est. street price / *Reader Service No. 612*
Panasonic PD / Panasonic Communications / (800) 742-8086, (201) 348-7000 / Price to be announced / *Reader Service No. 613*

A FRIENDLY FACE FOR WINDOWS

Microsoft Bob: The Social Interface

Hi, my name is Bob, and I'll be your home PC interface today. You'd like to see a menu? Well, we don't use menus; we use clickable objects, list boxes, and intelligent agents. Our specials are household management, finance, letter writing, and a brand-new component—the social interface.

The latest offering for the home user and student of the interface is the bizarrely named Microsoft Bob. Too informal to be called Robert, Microsoft Bob consists of three main components: an interface designed around homey scenes (more than 20, including living rooms, studies, and bedrooms); a group of intelligent agents (cartoon characters that help you find your way around the program); and a series of home and personal applications.

The interface—touted as the result of thousands of hours of usability testing and human-machine interactivity studies at Stanford University—isn't entirely new. Compton's Interactive Encyclopedia and other multimedia titles already use scenery as an interface, but Microsoft Bob uses more and packs security features to keep Mom out of the kids' diaries and the kids away from the household finances.

This Is Your Desktop: Bob gives quick and fun access to its own applets, but it makes finding your regular programs a little harder.

Microsoft Bob also has a series of shortcuts that users can pick up as they work with the system. The most interesting way to learn the ropes is with one of the agents—the animated characters that track your use of the software and offer advice tailored to your speed. This element—which earns Microsoft Bob the description "social interface"—is the product's unique spin. You have several options: an irascible parrot named Ruby, Rover the dog, a dragon named Java, and nine others. It may take a while to find one that doesn't irritate you.

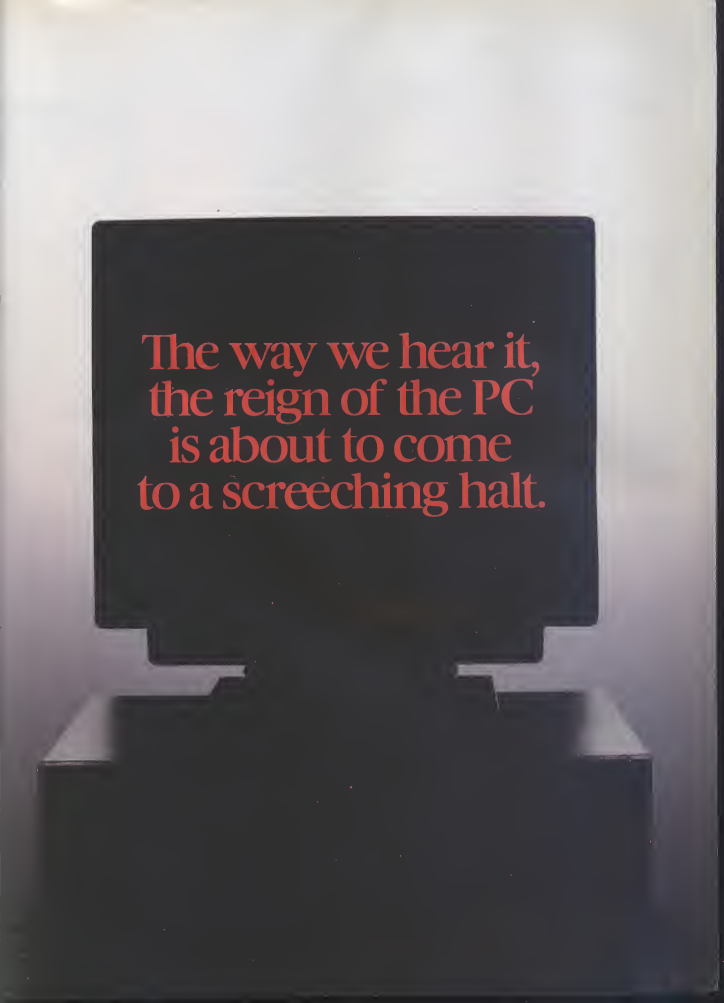
The apps that come with the program, while not industrial-strength, cover the home base nicely. There's a scheduler, basic finance tools, household management (home inventory, garden management, and so on), an e-mail front end to major online services, and a kid's game called GeoSafari.

Microsoft Bob is due to ship ready-installed on home systems—but they will need to be equipped with 8MB of memory to run it. **ML**

Microsoft Bob / Microsoft / (800) 426-9200 / $99 est. street price / *Reader Service No. 614*

Contributors to Pulse: Matthew Lake, Mike Hogan, James Oliver Cury, Rich Schwerin *Edited by* Wendy Taylor

PHOTOGRAPH BY ARNOLD TIOSEJO


The way we hear it,
the reign of the PC
is about to come
to a screeching halt.

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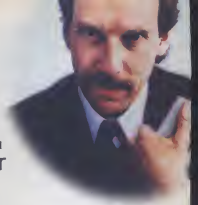
SIGMA DESIGNS

Circle 218 on reader service card.

REALmagic
As Big As It Gets

Paul Somerson



THE VISION THING

Maybe they're **WHISTLING IN THE GRAVEYARD.** Maybe they just don't get it. But they can't possibly be serious. Maximum industry leaders Louis Gerstner of IBM and Michael Spindler of Apple have come out **FIRMLY AGAINST THE FUTURE.** Or at least against playing leadership roles there. Gerstner started it off when he sniffed "The last thing that IBM needs right now is a vision." Spindler picked up the baton at a recent conference as he **BASHED** Microsoft's Bill Gates and Intel's Andy Grove for having "too much vision."

Well, maybe Spindler **ISN'T TOTALLY VISIONLESS.** He did talk wistfully of one element that—who knows—could become a **KEY STRATEGY:** "We still have to switch our computers on and off. We go to the rest room, and when we leave it flushes automatically." Perhaps a **WHOLE NEW METAPHOR FOR APPLE** is in store?

Spindler also **DUMPED ON THE INFORMATION SUPERHIGHWAY,** 500-channel TV, and electronic tools that organize our lives. But he saved his **REAL VENOM** for Gates and Grove, who were keynote speakers at Comdex/Fall: "They believe that just because of the technospeak it's going to happen, but it's not."

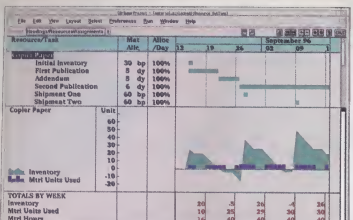
Technospeak? In his Comdex speech, Grove saw a future where the **TENFOLD KICK** ISDN offers over modems will make desktop video common and **BLUR THE DISTINCTION** between LAN and WAN, and where in 18 months the e-mail message volume in North America will **ECLIPSE FIRST-CLASS MAIL.**

Grove's vision is of systems with communications and multimedia **BUILT IN INSTEAD OF SLAPPED ON.** His proposed solution is *Native Signal Processing* (NSP), which **STEALS UNUSED CPU CYCLES** to handle jobs normally done by separate DSP chips.

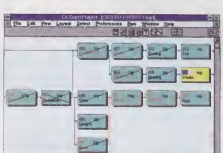
Gates's speech was **PREDICTABLY MORE AMBITIOUS.** Noting the continuing "exponential improvement" from the 33 MIPS 8088 to the 100 MIPS Pentium, he painted a world where **WALLET PCs** offer "books, catalogs, shopping approaches, professional advice, art, movies" on demand, where video phones supplant car phones, where TV is **INTERACTIVE AND SMART** (well, at least the interface is), where a global net really does offer virtually any information at your fingertips, where ATMs are **IN HOTEL ROOMS,** where even kids can do sophisticated multimedia programming, where teaching has **"THE PRODUCTION VALUES OF TV,"** where speech and natural language interfaces actually work, where you can buy a house or renew your driver's license remotely, and where a **"SOCIAL INTERFACE"** will open up technology to the masses and **SUPERSEDE TODAY'S GRAPHICAL INTERFACE.** Whew. Where do I get one?

Spindler **CAN KEEP KNOCKING** Gates and Grove all he wants. But here's the reality: This year at Comdex, those G-men were the keynotes. If the heads of Apple and IBM keep **LAUGHING AT SUCH VISIONARIES,** they each risk becoming just footnotes.

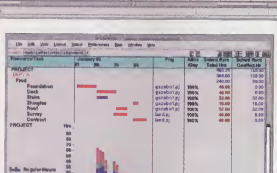
PHOTOGRAPH BY JAMES McGOON



Track and manage the production, inventory and use of materials in addition to the management of labor, equipment and other resources.



Change project views to see WBS or PERT charts showing dependency links, milestones and status.



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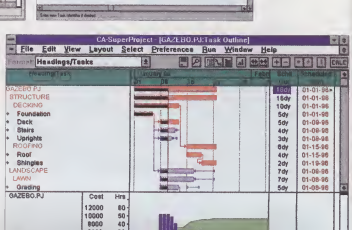

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John C. Dvorak

It's Show Time!

The first personal computer show I attended was in 1977. Dubbed the West Coast Computer Faire, it attracted a huge crowd and marked the beginning of the personal computer scene. It was a show for users. Over the years the shows grew, then suddenly started to fade until the whole scene was taken over by business geeks, and users were left with some Mac shows and swap meets. But now it looks like we're going to see a reemergence of computer shows for users. And the Comdex folks may be plotting to take over the entire show phenomenon.

Winning Formula? Comdex, for those of you who don't follow the industry, is a bunch of dealer and reseller shows highlighted by a monster show in Las Vegas every year called Comdex/Fall. The Interface Group, which sponsors the shows, has them all over the world and now sports unusual regional shows such as Comdex/PacRim in Vancouver. The company has wanted to go into user shows ever since it bought the West Coast Computer Faire a few years back. But it hasn't found the winning formula. I now suspect that it will turn Comdex itself into a massive be-all and end-all show for everyone from corner dealers to gawking newcomers. There soon will be a Comdex coming to your hometown.

The strongest indicator of this has been the annual Comdex show guides and the changing claims they've made. I've followed these since the show's inception. Comdex was originally what its acronym spelled out: a Computer Dealers Exposition. But the percentage of actual computer dealers who now attend is small.

What's taking place becomes obvious when you look at the annual greeting penned by show promoter Sheldon Adelson in the first few pages of each year's massive show guide. Study the subtle changes in the message over the years and you begin to see the show's evolution and understand its future direction. According to these letters, until 1984 the show was for independent sales organizations (ISOs)—and the show guide clearly said so on the inside cover. When Comdex shrank after the big 1983 show, the ISO moniker was dropped and Adelson sometimes mentioned resellers in his letter but mostly talked about the size of the show. In 1989 he started looking for a new theme. In 1990 he changed his photos and began to change the theme every year until now. Here are some direct quotes from the Adelson letters:

1988: Comdex is "big, really big" and "for resellers." This was the last "old theme" show.

1989: Comdex is dubbed "the gateway to the global marketplace."

1990: Comdex is called the "trade show for computer distribution professionals."

1991: Comdex is now the "world's leading international trade show and conference for computer professionals."

1992: Suddenly the show becomes the "world's #1 computer and communications marketplace."

1993: Now Comdex is "the world's #1 information technology event for resellers and corporate decision makers."

1994: The message is almost stable with one interesting word change. Comdex/Fall is "the world's #1 information technology marketplace for resellers and corporate decision makers."

Note the word *marketplace.* Because Comdex, until now, was not a selling show (vendors were not allowed to sell products on the floor), it's interesting to see this change from *event* to *marketplace.* In fact, many CD-ROM makers were selling discs on the show floor this year, something unheard of in the past. There was even a booth where they would clean your gold ring for free and you could buy some monitor screen window wash. Will encyclopedias, fake horoscope readings, and guys selling food choppers be next?

Hit the Ceiling Somebody finally saw that Comdex per se has reached its growth limit, that a number of competitors have appeared, and that the swap meet business is booming. At the latter shows (usually dubbed *computer shows*) the selling of computers, books, and boards is incredible.

Look for **COMDEX** *to turn itself into a* **MASSIVE** *computer show for* **EVERYONE** *from corner* **DEALERS** *to gawking* **END-USERS . . . .** *Coming soon to your* **HOMETOWN.**

The folks who run Comdex know its days as a pure trade show are numbered. It has already lost big clients, such as Compaq, and can expect an exodus of vendors because of the high costs and the lack of focus. By replacing the Compaqs with companies that can make money on the show floor selling computers, and by opening it to the public, Comdex suddenly becomes competition for CompUSA. The foreign attendees alone would flock to such a show. Most of them just want to buy products and haul them back home.

And here's the clincher: I suspect the Comdex management itself will have one of the largest booths and begin selling computers. I've always thought *Comdex* or even *Comdexx* would be a good brand name for a fast computer. Look for it soon.

PHOTOGRAPH BY JAMES McGOON

The ZEOS® Pantera™... "This Is As Good As It Gets."

–*PC World* Best Buy, August 1994

It's true! The ZEOS Pantera is as good as it gets. Leading experts from top industry publications all agree that the ZEOS Pantera is the best PC available. Unparalleled in its field, the Pantera has continuously earned award after award–month after month.

There's no desktop system that comes close to the ZEOS Pantera in performance, reliability, and value. As *PC Magazine* said: "Overall performance leader...the Pantera line has a lot to offer–strong performance at a reasonable price, with excellent documentation."

Supreme Performance

intel inside

The ZEOS Pantera, based on Intel's 486 and Pentium processors, is breaking record after record with its supreme power and awesome performance.

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The ZEOS Pantera 66MHz and 90MHz also received the highest scores in all benchmark tests run by *Windows Sources*, and earned two Experts' Pick awards. They said: "The clear winner is the ZEOS Pantera."

What makes the Pantera blow all others away? Superior engineering–starting with a ZEOS designed motherboard, created specifically to take full advantage of the latest technological advancements. The motherboard is stocked with exceptional features such as an on-board PCI Local Bus IDE Controller and support for up to four IDE devices. For the fastest video performance, we give you a Diamond Stealth 64-bit PCI video card with 1MB DRAM *standard*.

Valuable Extras

The Pantera is a first-rate example of ZEOS' commitment to provide you with an excellent value on an award-winning machine. With all the extras, options, and 100% compatibility with all major operating systems, you can't go wrong.

yes It runs with NetWare

Many of our most popular money-saving Pantera packages are ready to ship *the same day you order*. We also give you the option to custom-design a system to your exact computing needs.

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And the value doesn't stop with your purchase. Nobody does more to support you after the sale. ZEOS has won seven *PC Magazine* Readers' Choice for Service & Reliability awards.

Unequalled in performance, reliability and value, the ZEOS Pantera "is the ultimate Power Desktop." *PC World* added: "It's lightning fast, beautifully configured, and priced right." To get your best buy, call a ZEOS Systems Consultant today at 800-554-5218.

PC MAGAZINE EDITORS' CHOICE
Pentium-66 April 12, 1994
DX4-100 June 28, 1994

COMPUTER SHOPPER
Pentium-60 April 1994
Pentium-90 August 1994

PC WORLD
486DX2-66 January 1994 February 1994 March 1994 June 1994 December 1994 January 1995
DX4-100 October 1994 November 1994 December 1994 January 1995
Pentium-60 December 1994 January 1995
Pentium-66 June 1994 July 1994 August 1994 September 1994
Pentium-90 August 1994 September 1994 October 1994 November 1994 January 1995

PC Computing BEST
Pentium-66 May 1994

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DX4-100	$1795	DX4-100	$2095	DX4-100	$2595	DX4-100	$2995
Pentium-60	$1795	Pentium-60	$2095	Pentium-60	$2595	Pentium-60	$2995
Pentium-66	$1945	Pentium-66	$2245	Pentium-66	$2745	Pentium-66	$3145
Pentium-90	$2095	Pentium-90	$2395	Pentium-90	$2895	Pentium-90	$3295
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➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans		➤ Six-bay desktop case with two cooling fans	
➤ Microsoft Mouse		➤ Microsoft Mouse		➤ Microsoft Mouse		➤ Microsoft Mouse	
➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ MS-DOS 6.2, Windows for Workgroups 3.11	
				➤ **Lotus SmartSuite**		➤ **Lotus SmartSuite**	

Included With Every ZEOS Pantera:

- Genuine Intel® Processor. ZIF socket for easy upgrading.
- Diamond Stealth PCI local bus color graphics card with 1MB DRAM, upgradable to 2MB DRAM.
- Two high-speed serial ports and one enhanced parallel port on the motherboard.
- Slots: Three PCI & 4 ISA (486), 3 PCI & 5 ISA (Pentium).
- Flash BIOS.
- 200 watt power supply with built-in surge suppressor. Switchable between 115/230V.
- ZEOS 101-key space-saving keyboard.
- FCC Certified Class B; UL Listed.
- ZEOS Customer Satisfaction Package.

486 & DX4 Extras:

- RAM expandable to 128MB.
- EPA Energy Star compliant.

Pentium™ 60 & 66 Extras:

- RAM expandable to 192MB.
- Integrated business audio.
- On-board Fast SCSI-2 option.

Pentium 90 & 100 Extras:

- RAM expandable to 192MB.
- Integrated business audio.
- On-board PCI local bus Fast SCSI-2 & Ethernet LAN options.
- EPA Energy Star compliant (Pentium-90).

Additional processors available.

Favorite Options

528MB to 1GB Hard Drive Upgrade **$190**

1MB to 2MB Video RAM Upgrade **$59**

Diamond Stealth 64/PCI Video Card with 2MB VRAM
Fastest 64-bit accelerated video **$249**

Upgrade from a 14" to a 15" Monitor
ZEOS SVGA NI, 1024 x 768, flat screen **$95**

Upgrade from a 15" to a 17" Monitor
ZEOS SVGA NI, 1280 x 1024, flat screen **$345**

SCSI Controller Chip
For on-board SCSI. Includes drivers **$49**

Internal 14,400 bps V.32 bis Modem with 14,400 bps Send/Receive Fax **$99**

Internal 28,800 bps V.32 bis Modem with 14,400 bps Send/Receive Fax **$199**

ZNYX EtherAction™ 32
32-bit PCI Ethernet LAN adapter. 10Base5, 10Base2 and 10BaseT connections **$199**

Front Drive Bay PCMCIA SwapBox
Installs into 3.5" drive bay **$179**

Internal Tape Backup
80 to 250MB includes backup software **$149**

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Multimedia Upgrade
Turtle Beach sound card & stereo speakers **$128**

Lotus SmartSuite Upgrade
Upgrade you existing Lotus application with Lotus SmartSuite (five applications) **$299**

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Now: Free Lotus SmartSuite!

All Pantera packages include Microsoft DOS 6.2 and Windows for Workgroups 3.11. In addition, packages 3 and 4 include Lotus SmartSuite—1-2-3, Ami Pro, Freelance Graphics, Organizer and Approach.

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365 Days a Year

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Purchase orders are subject to approval. Business leasing programs available. All prices, specifications and availability are subject to change without notice, call to confirm these and warranty details. Prices do not include shipping. Novell compatibility is Developer Tested Only. Novell makes no warranties with respect to this product. All products and company names are trademarks or registered trademarks of their respective holders. Intel Inside and Pentium Processor Logo are trademarks of Intel Corporation. ZEOS is a registered trademark, Computers Now! is a registered servicemark, Pantera is a trademark of ZEOS International Ltd. © 1995 ZEOS International Ltd., 1301 Industrial Blvd., Minneapolis, MN 55413 USA. ZEOS is a publicly traded company (NASDAQ symbol: ZEOS) PAN-PCC-9562

Circle 282 on reader service card.

ZEOS Meridian™ Notebooks Are Opening New Doors.

Access uncharted territories. Enter avenues never before explored. Travel from portal-to-portal, from door-to-door, from work-to-home—in absolute comfort and confidence. The ZEOS Meridian notebook line is the doorway to your portable computing needs.

What makes the ZEOS Meridian one step ahead of the rest? Slamming performance and power up to 100MHz; durable, sturdy construction that will withstand the rigors of travel; and more options and extras than Bill has windows.

To meet your needs exactly, we offer you power, speed and memory choices—a genuine Intel 486DX2-50 or DX4-100 microprocessor; 4 or 8MB RAM user upgradable to 20MB; and IDE hard drives from 175 to 350MB.

The Meridian includes the hottest features: high-speed local bus video for super-fast performance; a comfortable palm rest; and an 84-key keyboard with inverted "T" arrow keys and an integrated TruePoint™ pointing device.

Meridian 400 with unretouched photo of active matrix display.

Meridian 800 with unretouched photo of active matrix display.

Meridian 400 Subnotebook

At just under four pounds, the ZEOS Meridian 400 subnotebook is molded from a special carbon-fiber material that cuts weight and improves durability. It offers you the perfect approach to traveling, working abroad, and second system computing. As *PC Magazine* said: "The ZEOS Meridian...pushes a subnotebook's abilities to new heights."

The 400 features three screen options: 7.9" diagonal active matrix, 7.9" diagonal passive matrix, or 8.2" monochrome. You also get two Type II PCMCIA slots and an external ultra-light 3.5" 1.44MB floppy drive (standard on Packages 2 and 3).

Meridian 800 Notebook

Desktop power to go! At six pounds and change, the ZEOS Meridian 800 is light enough to travel anywhere yet

it's large enough to use for presentations and regular desktop computing. You get the best of both worlds!

For your viewing pleasure, the 800 is available with your choice of color displays: a whopping 10.3" diagonal dual scan or 9.5" diagonal active matrix. The Meridian 800 also includes two Type II or one Type III PCMCIA slots; a removable hard drive; and an internal 3.5" 1.44MB floppy drive.

Buy With Confidence

No matter which ZEOS notebook you purchase, you can be assured you're getting the best service and support in the business! *PC World* said: "ZEOS's nonstop toll-free technical support schedule is unbeatable." *PC Magazine* agrees: ZEOS has won seven *PC Magazine* Readers' Choice for Service & Reliability awards. In addition, ZEOS was the first to provide 24-hour toll-free technical support–365 days a year–for quick and accurate answers to all your questions.

Travel is easier. Work is easier. Therefore, your life will be easier. With its durable design, awesome performance and technologically-advanced features, you'll be able to keep in touch with the office, write memos, and organize your calendar–wherever you are. It'll open new doors and provide access to priority documents– 24 hours a day. Be one step ahead of the rest with the ZEOS Meridian. Call your ZEOS Systems Consultant today at 800-554-5218.

EPA POLLUTION PREVENTER

Package 1			Package 2			Package 3		
Color	400C	800C	Color	400C	800C	Color	400C	800C
486DX2-50	$1995	$2295	486DX2-50	$2295	$2495	486DX2-50	$2595	$2795
DX4-100	$2395	$2695	DX4-100	$2695	$2895	DX4-100	$2995	$3195
Active Color	400A	800A	Active Color	400A	800A	Active Color	400A	800A
486DX2-50	$2695	$3095	486DX2-50	$2995	$3295	486DX2-50	$3295	$3595
DX4-100	$3095	$3495	DX4-100	$3395	$3695	DX4-100	$3695	$3995
➤ 4MB RAM ➤ 175MB IDE hard drive ➤ 800: Internal 3.5" 1.44MB floppy drive ➤ MS-DOS 6.2			➤ 4MB RAM ➤ 260MB IDE hard drive ➤ 3.5" 1.44MB floppy drive, 400: External, 800: Internal ➤ Custom carrying case ➤ MS-DOS 6.2 ➤ Microsoft Windows for Workgroups 3.11 ➤ Lotus Organizer			➤ 8MB RAM ➤ 350MB IDE hard drive ➤ 3.5" 1.44MB floppy drive, 400: External, 800: Internal ➤ Custom carrying case ➤ Extra battery ➤ MS-DOS 6.2 ➤ Microsoft Windows for Workgroups 3.11 ➤ Lotus Organizer		

Included With Every ZEOS Meridian:

intel inside

- ➤ Intel® 486DX2-50 or DX4-100 microprocessor.
- ➤ 8K (DX4:16K) internal system cache.
- ➤ RAM expandable to 20MB.
- ➤ IDE hard drive upgradable to 350MB.
- ➤ Local bus video with 1MB video RAM.
- ➤ Display: 640 x 480 color VGA backlit LCD, up to 256 colors. 400: 7.9" diagonal STN or active matrix. 800: 10.3" diagonal DSTN or 9.5" diagonal active matrix.
- ➤ Supports an external SVGA color monitor at resolutions up to 1024 x 768.
- ➤ PCMCIA slots. 400: 2 Type II, 800: 2 Type II or 1 Type III.
- ➤ 84-key keyboard with embedded numeric keypad, 12 dedicated function keys and inverted "T" arrow keys.
- ➤ Integrated TruePoint™ pointing device.
- ➤ Replaceable, rechargeable NiMH battery.
- ➤ Serial port, enhanced parallel port, external VGA video port, external keyboard or PS/2 mouse port (800 includes both). 400 also with external floppy drive port.
- ➤ Full power management features include Low Power mode and programmable Standby features.
- ➤ AC-DC adapter with full range from AC110-240V to DC.
- ➤ 400: 7.8" x 10.2" x 1.7"; 3.9 lbs. 800: 8.9" x 11.7" x 1.9"; 6.3 lbs.
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- ➤ FCC Certified Class B; UL Listed.
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Circle 265 on reader service card.

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MER-PC-9502

"Wow, I Could've Had a V.34!"

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Before you buy any other modem, check out the new Sportster V.34 from U.S. Robotics; the fastest, most reliable data/fax modem available today. Because the Sportster V.34 operates at an incredible 28,800 bps, it saves you phone and on-line time charges. The Sportster utilizes true ITU-T V.34 standard protocol and is fully downward compatible with 14,400 bps and Rockwell V.FC™ modems.

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Circle 102 on reader service card.

Gil Schwartz

Bottom Fishin'

Psst. Hey, you. That's right, I'm talking to you. No, not you over there, with a corporate office the size of Rush Limbaugh's belt and a budget to match. I'm talking to you over there, with the comfy shoes and the tie pulled down in front of your open collar. And you, too, who used to be chained to a desk at Omnivore Corp. way downtown, but who now does quite a bit of the job at home, one of the tens of millions of folks who now do so, and more so every year.

Have I got a deal for you.

First, a little history. Not long ago I passed my associate's office door and heard a small, disconsolate snuffling. "Barb?" I inquired. She's a rather tough cookie, been with us for more than a decade. Hide of a rhino. Spirit of an eagle. Competitive drive of a hungry wolverine.

"What's the problem, Babs?" I said.

"It's this . . . thing," she said, staring at her computer. I admit it was a sorry object—an old 286 from Year One with a hard drive the size of Monaco and a puny 728K of RAM to roam around in. "Crash . . ." she gulped. I had been fearing this for a while. The budget for such things was all but exhausted. Whatever I did buy had to come in under the cut-off point where discretionary spending turns into a capital expenditure and must be cleared. That amount was . . . $1,000.

I went downstairs to the computer warehouse on the corner. The salesman came over to me. I think his name was Rashi. He was friendly. "What's the low end you have in desktop PCs?" I asked him.

"We have a 486SX-25 with 4 megs of RAM and a 120 meg hard drive, with a 0.39 dot pitch SVGA monitor." The sales dude was already looking over my shoulder for the more Pentium kind of guy.

"How much is that?" I said, expecting one of those no-win sums just under what a real computer would cost me. Too much for too little, you know.

"Seven hundred and fifty dollars," he said. I nearly lost control of my poker face.

"What kind of computer is that?" I asked, expecting some mishmash house-brand that would send me screaming for the next mail-order catalog.

"That would be an IBM brand computer, brand new, with full warranty and our in-store promise of a new model if anything goes wrong in the next 30 days."

I bought the thing there and then. Put it on my credit card and passed it through that very afternoon as an expense-account item. Hey, I've had dinners for four that exceeded that amount.

I won't embarrass you by telling you the shower of employee regard showered upon me when I showed up in Barb's office with her new toy. It's one of those moments that makes you glad to be a great and beloved manager of the people.

I felt good about myself all week after that—$750 for a brand-new IBM that suits the need of its recipient perfectly and should, if cared for, outlast six generations of bus fads? Talk about a no-brainer!

But it gets better.

Cut to my wife, sitting in our basement "home office" surrounded by Tinkertoys, Legos, toy soldiers, Barbie body parts, and a host of semiacceptable cybernetics. "What's the matter with this thing?" she says to me one evening as I return from a day in the tar pits. She is pointing to our ancient Acer 8088, whose hard drive has been going soft for some time now. The object is making the noise that cheese food makes while being extruded from its handy tube.

"I don't want a new computer," says my wife. "I want this computer." Further interrogation reveals that what my wife means is that she wants a machine that will run WordPerfect without coughing up silicon.

I took a drive. There's a little electronics store not too far from me. I went in, not really hoping for anything. I asked the same shameful questions. Gave the same grievous answers. No, I was not interested in anything clock doubled. No, built-in CD-ROM would not be a requirement. Cheap and reliable, that was the ticket.

"Well," said the sales fellow, whose name was Duane. "I've got a brand-new 386-20 with four megs of RAM and a . . . wow! . . . a 260 meg hard drive. He was looking at the information on his screen with some disbelief. "Take it without a monitor for $475."

"I don't know . . ." I said.

"OK, OK," he said. "$425."

So that's what I did. It's an IBM also, by the way. Not loaded down with any fonts or heavy start-up requirements, it runs Windows in rather zippy fashion, and of course blows the socks off what my wife used to own. She's ecstatic. I'm a hero. Life is good.

So a word to the wise. Somewhere near you, right now, there are equally astounding buys just waiting—great little low-end buddies for growing businesses and chip-hungry families just like yours. Sure there are times to gobble up the high-megahertz mothers and hit the ground running hard and hot. But not always, right?

So get going. This is a great day for cheap-skates, and it's not going to last forever.

Or is it?

There are some **AMAZING, ASTOUNDING** *deals out there for those* **HUMBLE** *and* **PRACTICAL** *enough to turn in their* **POWER USER STRIPES . . .** *at least for* **A WHILE.**

PHOTOGRAPH BY JAMES McGOON

ViewSonic has become synonymous with providing superior high performance color monitors to a demanding industry. As a recognized price/performance leader, we are committed to designing outstanding monitors that continue to win awards. In fact, here are some comments from a few editors:

PC WORLD

"Some folks crave performance. Some look for price. And then there are those who want it all. If you belong to the third crowd, the ViewSonic 17 is the monitor for you." **– PC World; April 1994**

PC Computing BEST

"Best color quality, best sharpness and best versatility – what more could we ask of the ViewSonic 17? Frankly, we were surprised that one monitor could do it all."

– PC Computing; January 1994

"ViewSonic has one of the sharpest, most detailed and well-focused displays around."

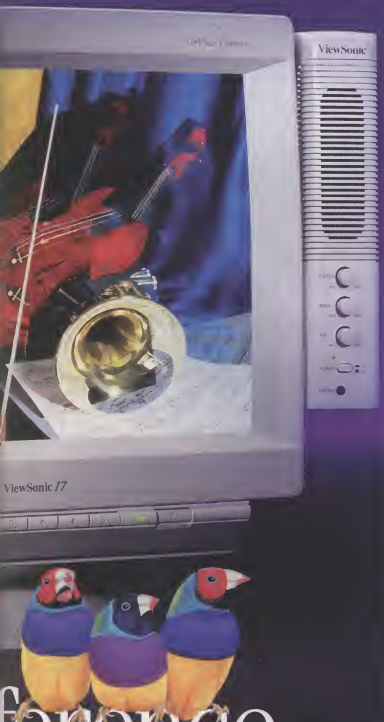
– Windows; September 1994

Our ***new*** ViewSonic 17 monitor is loaded with features including OnView™ controls (on-screen menu to adjust screen images to your liking), ViewMatch™ (matches screen colors to printer output), ARAG® coating (virtually eliminates screen glare and reflection), and refresh rates up to 160Hz. No wonder this 17" monitor (15.7" diagonal viewable area) keeps on winning awards, generation ... after ... generation!

See. A

The Dif

nd Hear.



ference.

With an eye and ear towards the future, ViewSonic is expanding into the world of multimedia – with our new ***PerfectSound***™ Model VS127 speakers. These ***amplified, magnetically shielded*** speakers are designed to be attached to the monitor or stand alone. In fact, when attached to our monitor they blend in so well they appear to be built-in. And they utilize state-of-the-art ***wave guide technology*** combined with a bass enhancing ***super woofer***. These speakers pump out high fidelity sound with such power and clarity that you'll find it hard to believe you're listening to a compact 14 watt system. ***PerfectSound***™ speakers offer advanced audio technology combined with an ***ergonomic, space saving design*** – each speaker is only 2.4" wide! Controls include bass, treble, balance and master volume.

Sounds so vibrant and realistic, you'll swear you're sitting in front of an orchestra – not your computer!

The ViewSonic 17 is MPR-II low radiation and EPA Energy Star℠ compliant.

The first of the multimedia product line from ViewSonic!

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Call FaxSonic at (909) 869-7318 (fax-on-demand)
Request Doc. 320 (VS127), 152 (17)
Applelink: VIEWSONIC Compuserve: 73374, 514

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Circle 171 on reader service card.

New! ■ Pereos, Tahoe 230, Pinnacle Micro RCD-1000

Critical Mass Storage

You're on top of the latest in computing trends. You take a notebook home with you and on business trips. You deal with enormous files—and sometimes distribute them to large numbers of people. You have a 1GB hard drive (on your shopping list, at least).

In other words, you work with mass quantities of data. But how do you back it up and share it among colleagues and clients? Still satisfied with QIC-80 tape drives hanging off your floppy controller? We didn't think so. That's why you're in the market for at least one of three new data storage devices.

Form Follows Function Datasonix's Pereos and Pinnacle Micro's Tahoe 230 and RCD-1000 use three different technologies to handle storage capacities from 230MB to more than 1GB of compressed data for three distinct purposes. The Pereos is essentially a portable backup device. The Tahoe 230 is a mass storage and access device, useful for transporting files of up to 230MB between machines or for personal backup. And the Pinnacle Micro RCD-1000 is for burning small-run CD-ROMs—from multimedia titles to company databases.

Installing these units posed no problems. The Pereos is a parallel device that you simply have to plug in for it to work, while both Pinnacle Micro units use Adaptec SCSI interfaces with smart EZ-SCSI installation software. They explode the myth that installing and configuring SCSI devices loses you an afternoon's work.

The Pereos is the cutest device we've ever called useful. Three-quarters the size of a desktop Scotch tape dispenser and weighing a little more than a pound—complete with its parallel interface—the Pereos can fit into your jacket pocket. And running off two AA batteries, it's rated to back up at 10MB per minute—although with verification and compression, it's closer to half that.

The Pereos tapes are about the size of a thumbnail and hold data in a proprietary helical-scan format. The proprietary nature of the format doesn't matter much, since the tapes won't fit into other drives anyway. But it does mean that you have no choice of backup software. Fortunately, the Pereos comes with its own first-rate backup software. A simple button-based utility puts file sharing, backup, restore, and other common tasks all within easy reach.

A single gripe: The Pereos has a 4.5-volt DC input, but there's no adapter in the pack. Sure, the mobile computing scenario makes AA batteries more attractive. However, even with an estimated life of several months, the batteries are likely to run out on you at an inopportune moment.

Optical Nerve Center In a different league altogether is the Tahoe 230 optical drive. It handles last-generation 128MB magneto-optical disks (if you have them), but it's designed to read, write, and rewrite 230MB 3.5-inch disks, which retail for around $55 each. Aimed at

OVERVIEW Data on Demand

Stash It: The Pereos (top left), the Tahoe 230 (bottom left), and the Pinnacle Micro RCD-1000 (right) offer unique ways to store large quantities of data.

Mega Media: All three drives can serve different storage needs for the same system. Want to share or back up mass quantities between laptop, home, and desktop systems? Pack a Pereos. Need to save high-volume projects that you can access fast? The Tahoe 230 is the way to go. And for distributing large volumes of data, record your own CD-ROMs with the Pinnacle Micro RCD-1000.

PICKS HIGH-VOLUME **STORAGE**

Affordable portable storage—and cute, too	Datasonix Pereos
Speedy re-recordable media for archiving	Pinnacle Micro Tahoe 230
Quick and easy way to press your own CDs	Pinnacle Micro RCD-1000

PHOTOGRAPHS BY ARNOLD TROSEJO

Pereos

USABILITY: *Plug it in, back up, and restore at will. It doesn't get much more usable than this.* ****½
TECHNOLOGY: *Parallel-port transfer onto tiny proprietary tape.* ***
VERDICT: *Full backup and restore for your overnight bag.* ****

Tahoe 230

USABILITY: *Once installed, it's just like any other drive.* ****
TECHNOLOGY: *Choice of SCSI-2 or parallel interfaces; rewritable optical disks.* ****
VERDICT: *A versatile option for large-scale file transfers.* ****

Pinnacle Micro RCD-1000

USABILITY: *As easy as any recordable CD software can be—which isn't saying much.* ***
TECHNOLOGY: *SCSI hookup to CD-Recordable drive.* ****
VERDICT: *A great choice for read-only material.* ****½

SIDE BY SIDE

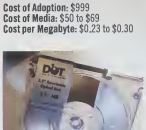
MATCH THE **MEDIA** TO THE TASK

Datasonix Tapes: So tiny that you'd take them for toys, Pereos's 612MB capacity tapes (1.25GB when compressed) have a few disadvantages as a backup medium: They're nonstandard, too small to label effectively, and easy to lose.

Cost of Adoption: $595
Cost of Media: $49.95 (two tapes)
Cost per Megabyte: $0.04

Recordable Optical/ Magneto Optical: Pinnacle Micro's Tahoe 230 is fast, and its 230MB disks have almost twice the capacity of the previous generation of 3.5-inch magneto-optical disks.

Cost of Adoption: $999
Cost of Media: $50 to $69
Cost per Megabyte: $0.23 to $0.30



CD-Recordable: With 650MB of capacity and the widespread proliferation of CD-ROM drives, CD-Recordable technology is an excellent way to share many megabytes of data. On the downside, the discs scratch easier than regular CD-ROMs.

Cost of Adoption: $2,995
Cost of Media: $15 to 29
Cost per Megabyte: $0.03 to $0.04

high-volume users like service bureaus and anyone doing large-scale graphics projects or multimedia-intensive work, it's not the most inexpensive storage option in the world—the drive goes for just under $1,000. But it delivers data fast enough for it to serve as a "live" disk drive instead of just an archiving device.

Tahoe 230 runs best using the included SCSI interface, but it doubles as a parallel device if you don't mind a speed hit. This opens the drive to portable use, which is enhanced if you take advantage of an optional battery pack that delivers just over 3 hours of juice from a full charge.

For a 3.5-inch drive, its capacity is just fine (you need to go up to a 5.25-inch drive to get above 1GB). But if you're working on serious multimedia or graphics projects, its 230MB capacity might have you disk-swapping in search of files.

CDs-R-Us The costliest option for read-only storage is CD-Recordable technology (between $1,000 and $3,000). It may not be for everyone—it's write-once, and the cost of adoption is prohibitive for now—but if you're dedicated to CD-ROM as a distribution technique, the Pinnacle Micro RCD-1000 is at the high end of the price and quality scale. This drive is an early entrant into the high-speed recordable CD-ROM arena, one soon to be clogged with offerings from sources as diverse as Creative Labs, Philips LMS, and Sony.

The Pinnacle Micro RCD-1000 supports the requisite CD formats for both Windows and Macintosh systems. It has a fast SCSI interface, and its software makes easy work of burning a one-off CD-ROM master or limited-distribution disc.

If your primary need is a reliable backup system for your laptop and desktop systems—or if you want to share data between them—the Pereos is the most compact way we've seen to do it. For affordable, rewritable optical storage, go with the Tahoe 230. And for one of the early entries in the recordable CD market, the Pinnacle Micro RCD-1000 is the way to go. **MATTHEW LAKE**

FILEBOX

Pereos

Features (as tested): Parallel interface.
Capacity: 612MB uncompressed, 1.25GB compressed.

$550 est. street price
Datasonix
(800) 328-2779, (303) 545-9500
Reader Service No. 616

Tahoe 230

Features (as tested): SCSI interface.
Capacity: 230MB.

$899 est. street price
Pinnacle Micro
(800) 553-7070, (714) 727-3300
Reader Service No. 617

Pinnacle Micro RCD-1000

Features (as tested): SCSI interface.
Capacity: 650MB.

$2,500 est. street price
Pinnacle Micro
(800) 553-7070, (714) 727-3300
Reader Service No. 618

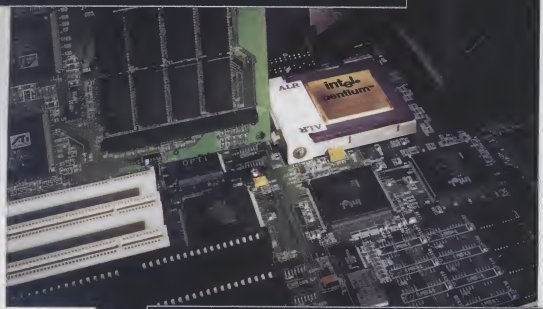
Guide to the Ratings

In each applicable area—usability, performance, technology, and verdict—a product is awarded from one to five stars. In some cases, other factors (such as price) also affect a product's verdict.

******* Excellent** A market leader that offers exceptional performance.
****** Good** Excels in a few areas; a good buy, though not perfect.
***** Acceptable** Average for its class; a justifiable purchase.
**** Poor** Out-of-date or substandard, possibly offset by some positive features.
*** Unacceptable** Missing necessary features or suffering from subpar implementation; avoid.

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Industry's First 75-MHz Pentium PCI System.



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With six three PCI Plug 'n Play expansion slots, the advanced ALR EVOLUTION X75 makes adding enhancement cards as simple as possible. Just plug a PCI card in... the EVOLUTION X will automatically configure it for you.

intel inside pentium

We use only genuine Intel microprocessors on our quality computer systems.

System shown with optional monitor and ALR IDE CD-ROM Drive

Value priced below 60's. $1795

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1. *75-MHz Pentium Processor enhanced with PCI Local Bus Technology*
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Circle 140 on reader service card.

ThinkPad 755CD vs. Panasonic CF-41

Multimedia in an Overnight Bag

ThinkPad 755CD

USABILITY: *It's the standard for all portables.* *****
VERDICT: *It's expensive, but you'll find none better in the world.* ****½

Panasonic CF-41

USABILITY: *Good trackball and big screen, but we'd like a snappier keyboard and less heft.* ***
VERDICT: *The most affordable CD portable you can buy.* ****

Road Spin: Panasonic (left) and IBM (right) have given us the first CD-ROM–equipped portables.

How quickly the tables turn. Just when notebooks seemed interminably caught in a game of feature catch-up with desktop PCs, two multimedia portables—IBM's ThinkPad 755CD and the Panasonic CF-41—invert the rules. Quite simply, they're two of the fullest-featured PCs money can buy, portable or otherwise.

Premium Portable The ThinkPad 755CD features a full-sized dual-speed MPC 2-compatible CD-ROM drive, which swaps out with the floppy drive. An integrated Mwave digital signal processor functions as a 14.4Kbps fax modem, telephone, answering machine, and Sound Blaster–compatible 32-voice MIDI audio card (competitors, take note). This frees the machine's standard Type III PC Card slot for extra storage, a cellular digital modem, or any of a growing stable of devices that plug in to a PC Card slot.

The ThinkPad 755CD's greatest innovation, however, is that its multimedia capabilities are entirely self-contained. Two miniature stereo speakers reside behind the function keys—excellent for taking your business presentations on the road. Audiences of eight or fewer will have no trouble discerning subtleties even in complex audio tracks. And for presenting to bigger crowds, speaker (and headphone) jacks are also within easy reach. There's a manual volume control on the notebook's keyboard as well.

The ThinkPad 755CD has retained IBM's generous 10.4-inch TFT color display. However, it now features IBM's unique black-matrix-on-array technology, which improves visibility in brightly lit offices, conference rooms, and glaring airplane window seats. This is a welcome though hardly showstopping enhancement. There's also Super VGA support onscreen, not just on an external monitor. Capable of more than 65,000 simultaneous colors at 640 by 480 resolution, this screen is a standard against which other notebook displays should be judged.

Incidentally, there's true videotape support should your presentations call for it. The ThinkPad 755CD can capture still or motion pictures from a VCR or video camera (yes, in both industry-standard formats: NTSC and PAL). And for your next presentation, just connect the notebook to the television/VCR found in most conference rooms—audiences love a big screen.

Even Better A number of subtle ergonomic refinements help IBM keep its leadership in usability. The TrackPoint II pointing stick now features a textured surface (akin to a cat's tongue) so that your fingers don't slip from it. Big Blue has improved ballistic control of the pointer as well, so that pushing hard against it doesn't slam the cursor to the edge of the screen. This also takes care of the creeping cursor that early ThinkPad owners are familiar with. And kudos for the LED status lights, though we'd still prefer to see an LCD indicator panel similar to what's used on high-end Toshiba notebooks.

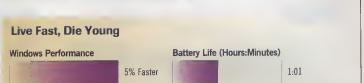
You certainly can't fault the ThinkPad 755CD's keyboard. It's the best on any portable in the world: full-sized function, cursor, shift, and backspace keys, and plenty of key travel. And the function keys are clustered in groups of four, just as they are on a full-sized desktop keyboard.

The ThinkPad 755CD's muscle won't disappoint you either. It comes equipped with an upgradable 100MHz DX4 CPU, 8MB of RAM (expandable to 40MB), a 540MB or 810MB removable hard drive, and accelerated video running on VESA local bus.

The ThinkPad 755CD is among the first notebooks to feature an integrated infrared port, which lets you transmit

Energy Zappers: Expect less than 2 hours of charge from one battery if you're on the road. Fortunately, the Panasonic CF-41 lets you swap out the floppy and carry two batteries.

Live Fast, Die Young



NOTE: WINSTONE 96 RUNS 13 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. ZDIGIT BATTERY RUNDOWN TEST MECHANICALLY SIMULATES KEYSTROKES.

PHOTOGRAPH BY ARNOLD TIOSELIO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

New! HARDWARE: ThinkPad 755CD vs. Panasonic CF-41

SIDE BY SIDE TWO WAYS TO TAKE MULTIMEDIA WITH YOU

Small Talk: Oh-so-tiny speakers belt out mellifluous stereo sound even in crowded rooms thanks to the ThinkPad 755CD's programmable DSP that also doubles as a telephone and answering machine.

Under the Hood: Raise the keyboard on the Panasonic CF-41 and you'll find a dual-speed, multisession CD-ROM drive underneath. There's even a space next to the drive for a spare disc for the road.

PICKS CD-ROM PORTABLES

No-compromise portable multimedia	IBM ThinkPad 755CD
Affordable CD-ROM multimedia for the road	Panasonic CF-41

Status Symbol: IBM's ThinkPad 755CD is one of the finest systems you can buy, portable or otherwise. But you pay for the privilege. The Panasonic CF-41 offers the same core multimedia and CD-ROM capabilities for $1,550 less.

FILEBOX

ThinkPad 755CD

Features (as tested): 8MB of RAM, 810MB hard drive.

Weight: 7.3 pounds.

Expansion: Up to 40MB of RAM, 540MB or 810MB hard drive, two Type II PC Card slots or one Type III.

$8,149 est. street price
IBM
(800) 426-2968
Reader Service No. 619

Panasonic CF-41

Features (as tested): 8MB of RAM, 450MB hard drive.

Weight: 7.9 pounds

Expansion: Up to 32MB of RAM, 260MB or 450MB hard drive, two Type II PC Card slots or one Type III.

$6,599 est. street price
Panasonic
(800) 742-8086
Reader Service No. 620

data from as far away as 3 meters at up to 115Kbps. It supports Hewlett-Packard's infrared standard (115Kbps) as well as Sharp's (9.6Kbps).

Features, power, and superb usability—is there a trade-off? Yes, the ThinkPad 755CD has a bit of heft: 7.3 pounds, not including the AC adapter. Also, the machine doesn't come cheap. With an 810MB hard drive and TFT display, the ThinkPad 755CD sets you back an eye-popping $8,149.

Budget Multimedia For about $1,550 less, you can pick up the canny new Panasonic CF-41 notebook, which offers almost as much capability, if not quite the same level of refinement. Like the ThinkPad 755CD, the Panasonic CF-41 comes powered by a 100MHz DX4—though you have a selection of CPUs, ranging from 50MHz 486DX2s to Pentium processors (not available at press time). The standard configuration includes 8MB of memory, expandable to 32MB. You have a choice of a 260MB or 450MB removable hard drive, and Panasonic says it will offer larger capacities as they become available.

Like the ThinkPad 755CD, the Panasonic CF-41 offers stunning multimedia capability, thanks to a 10.4-inch, active-matrix TFT color display capable of 65,500 colors at 640 by 480 resolution. In addition, 16-bit Sound Blaster–compatible audio is standard with dual stereo speakers located just above the keyboard, and the quality is just as good as the ThinkPad 755CD's. Press a front-mounted release, and the keyboard pops up. Underneath it there's a dual-speed, multisession MPC 2–compatible CD-ROM drive. There's even a holding bay for an additional CD-ROM disc next to the drive—a crafty innovation.

Just Like Home We've always liked the keyboard layout of Panasonic portables because of their full-sized cursor controls and independent Page Up, Page Down, Home, and End keys. Still, greater key travel and crisper response on the Panasonic CF-41 would be appreciated. As for the trackball, it's a rather large center-mounted device that drops just below the space bar, allowing hands to operate it without leaving the keyboard. It's one of the better ones we've seen.

At 7.9 pounds, the Panasonic CF-41 weighs more than the ThinkPad 755CD. It's also larger (9.25 by 11.7 by 2.25 inches)—too large for traveling in our opinion.

Like the ThinkPad 755CD, the Panasonic CF-41 features one Type III PC Card slots or two Type II slots.

Panasonic packs full MPC 2 multimedia capabilities into a relatively economical package. For traveling presentations, the Panasonic CF-41 is a steal. Despite its higher price tag, however, the ThinkPad 755CD is still a better deal. The Panasonic CF-41 lacks infrared capability, support for videotape, and built-in telephony. As a desktop replacement, there's no comparison. And given the CF-41's smaller hard drive and greater girth, the ThinkPad 755CD is the notebook of choice. MARTY JEROME

PHOTOGRAPHS BY ARNOLD TIDSELIO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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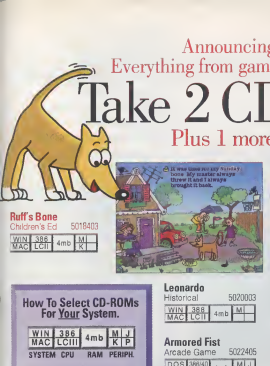

Ruff's Bone
Children's Ed 5016403
WIN 386 MAC LCIII 4mb M

Corel Gallery
Clip Art Library 5010301
WIN 386 2mb M MAC KP

The New Kid On The Block
Children's Ed 5018304
WIN 386 MAC LCIII 4mb M

The Residents: Freak Show
Music 5013909
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Police Quest: Open Season
Advent Game 5002803
DOS 386 4mb M

System Shock Enhanced
Arcade Game 5022900
DOS 386/40 4mb M J K

Doom II
Arcade Game 5021506
DOS 386/33 4mb M J K

Microsoft Musical Instruments
Music 5012802
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Naval Simulation 5001102
DOS 386 4mb M J K

NHL Hockey 95
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DOS 386 4mb M

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Travel 5011505
WIN 386 4mb M P

Prehistoria
Historical 5009105
WIN 386 MAC LCIII 4mb M P

The 7th Guest
Interact. Game 5004700
WIN 386/33 MAC LCIII 4mb M

Inherit The Earth
Advent Game 5002100
DOS 386 MAC LCIII 4mb M

Guinness Disc Records
General Interest 5009204
WIN 386 MAC LCIII 4mb M

Microsoft Bookshelf
General Ref. 5009402
WIN 386 MAC LCIII 4mb M

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Interact. Game 5004304
WIN 386/33 MAC LCIII 4mb M

How To Select CD-ROMs For Your System.

WIN MAC	386 LCIII	4mb	M J K P
SYSTEM	CPU	RAM	PERIPH.

SYSTEM Button indicates the available operating environment(s) for a given selection: DOS (for PC), Windows (for PC), Macintosh.

CPU Button indicates the *minimum* processor required. If a title is available in PC and Macintosh formats, the top half of the button represents PC system requirements and the bottom half represents Macintosh system requirements. Note: Ser.=Series, Class.=Classic, Pent.=Pentium For Mac - LC series includes LC 475, Performa 475, Quadra, Centris, Powerbook 180C, IIFX or better

RAM Button indicates the *minimum* amount of RAM required.

PERIPHERALS Button indicates required peripherals: M=mouse, J=joystick, K=keyboard, P=printer.

For all titles, the *minimum* system requirements recommended (unless otherwise indicated) are: Hardware: SVGA monitor (256 colors), sound card, 40Mb hard drive, double speed CD-ROM drive. Operating System: DOS 5.0, Windows 3.1, Macintosh System 7.0

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A Cure for Color Output Envy

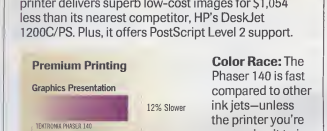
If you're part of a small office or workgroup that needs high-quality low-cost color printing, you're in luck because your options just doubled.

Not long ago, the choice was simple: Hewlett-Packard's DeskJet 1200C or 1200C/PS. But with the introduction of its Phaser 140 ink-jet printer, Tektronix leaps head-first into the competition, giving HP a run for the money and putting you in the enviable position of having to choose between two great products. Like the DeskJet 1200C/PS, the Phaser 140 provides network options and a versatile solution for those who need quality color at a bargain price.

It's a Setup Just because it's powerful doesn't mean the Phaser 140 is intimidating. It's about as easy to set up as any ink-jet printer, just don't wear a white shirt when you do it. We managed to splatter some liquid ink when removing the cartridges from their plastic bags—a problem we've never had with other ink jets. Setup was a breeze from there, however, including easy driver installation and intuitive front-panel menu navigation.

The Phaser 140's software isn't quite as friendly as that of the DeskJet 1200C/PS. Tektronix lets the user have a significant amount of control over various printing elements, including color correction (for example, none, vivid color, or match screen), halftone frequency, and halftone angles. But if you're like most ink-jet printer users, these terms will confuse you before they help make your output look better. Some visual examples or a tutorial would have been helpful to explain the effects different configurations are likely to have on your printouts.

Cool Tones: Tektronix's Phaser 140 color ink-jet printer delivers superb low-cost images for $1,054 less than its nearest competitor, HP's DeskJet 1200C/PS. Plus, it offers PostScript Level 2 support.



Color Race: The Phaser 140 is fast compared to other ink jets—unless the printer you're comparing it to is HP's speedy top-of-line DeskJet 1200C/PS.

The output quality of the Phaser 140 is just what you would expect from Tektronix: impressive. It produces rich, even colors; fine detail; and smooth color gradients.

Casual Consumption Like any ink-jet printer, output quality increases dramatically when you use coated or glossy stock. In these cases, the Phaser 140's output doesn't even remotely resemble that of an ink jet, and rivals the rich hues of color lasers (which cost about six times more but yield a lower per-page cost). Of course, the drawback of this stellar output is higher printing costs—look to pay about 10 cents per sheet for coated paper and about a dollar per sheet for glossy.

In the performance arena, the Phaser 140 is no slouch when compared to other ink-jet printers—as long as those other printers aren't the DeskJet 1200C/PS. The Phaser 140 turned in slower times than the DeskJet 1200C/PS in every performance test, especially plain text printing (where it was more than 75 percent slower). However, the performance of the printers was nearly identical for graphics. The Phaser 140 printed a presentation only 12 percent slower than the DeskJet 1200C/PS.

Although you'll want to keep the power of the Phaser 140 to yourself, it's designed to be shared. It ships standard with parallel and LocalTalk ports, in addition to PostScript Level 2 support, so it can hold its own in the mixed company of Macs and PCs. You can also purchase several network options for NetWare, EtherTalk, and TCP/IP protocols.

At $1,695 the Phaser 140 is a high-ticket ink jet. But it's also $1,054 less than its closest competitor, the DeskJet 1200C/PS. What the extra money buys is speed. But with PostScript Level 2 support and output that's too good to be true, your money will be well spent on the Phaser 140. **KYLA K. CARLSON**

USABILITY: *Easy setup, but the software could be friendlier.* ****
PERFORMANCE: *HP's DeskJet edges it out.* ****
TECHNOLOGY: *Standard ink-jet engine.* ****
VERDICT: *Superb color output for hundreds less than the competition.* ****

FILEBOX

Phaser 140

Competition: Hewlett-Packard's DeskJet 1200C/PS, which costs $2,749 ($1,839 without the PostScript Level 2 option).

Features (as tested): PostScript Level 2, 8MB of RAM (expandable to 24MB).

Resolution: 360 dpi.

Ink Cartridge Costs: $10.95 for black, $8 for each other color.

Cost Per Page: 1.5 cents for plain-paper black and white, 18 cents for plain-paper color, 30 cents for coated-paper color, $1.20 for glossy-paper color.

$1,695 list
Tektronix
(800) 835-6100, (503) 682-7370
Reader Service No. 621

PHOTOGRAPH BY ARNOLD TIZBIRJO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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(1) Winbench 4.0 score based on in-house testing of a 2 MB MGA Impression Plus PCI board using a Compaq DeskPro XL, Pentium®-90. 16 MB RAM. 512KB cache at 1024 x 768 x 256 colors, 75Hz
(2) Hardware video acceleration only available with MGA Impression Plus
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PC MAGAZINE
"(MGA Ultima Plus) is one of the fastest cards we have seen."
PC Magazine,
Best of 94 Jan. 10, 1995, p. 142

MVP WINNER
"It's the MGA Impression Plus[1] combination of sophistication and down-to-earth street price that wins it our MVP Award this year."
PC Computing, Dec. 1994, p. 140

matrox

Circle 155 on reader service card.

New! **HARDWARE:**
Citizen PN60 vs. PocketJet

Is That a Printer in Your Pocket?

Most of us wouldn't think twice about taking an umbrella to Seattle. Ask someone to take a printer on the road, however, and you're likely to hear a laundry list of reasons against it. But what if that printer took up no more space than an umbrella?

No more what-ifs. Citizen and Pentax have rewritten the rules of portable printing. With the Citizen PN60 and Pentax's PocketJet you can have high-quality printing on the road—and your bags will be only 2 pounds heavier. Say good-bye to faxing those contracts when you get back to the office. And no more having to scurry around a client's office looking for a printer connected to a computer that has the same applications as the document you want to print.

The Citizen PN60 and the PocketJet look like not-so-distant cousins. With its battery, the Citizen PN60 packs a little more heft than the PocketJet (almost 4 additional ounces of weight) and a little more girth (10 by 1.85 by 2.5 inches compared to 10.04 by 2.16 by 1.18 inches). Both printers ship with light power adapters, though the Citizen PN60's does weigh a bit less than the PocketJet's.

Under the Hood But looks aren't everything. Once you dig into these little printers, you'll find some significant differences. While both use a thermal technology, the Citizen PN60 uses thermal transfer whereas the PocketJet uses thermal fusion. With thermal transfer you get the benefit of printing on plain paper and media such as envelopes. But you also have the burden of carrying consumables and purchasing ribbons when yours run out. With thermal fusion you need never purchase more ink, but you have to print on special coated thermal paper, similar to fax paper.

We found the output quality of the Citizen PN60 to be fairly good, though we recommend printing on high-quality paper. Plain paper, although convenient, tended to yield somewhat splotchy results. The PocketJet had clear black-and-white output, though the paper feels low in quality and doesn't make for impressive leave-behinds.

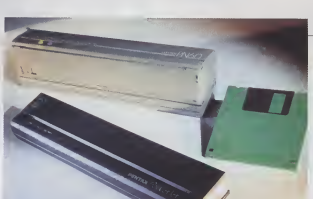
Even more of a difference than printing technology is the fact that the Citizen PN60 supports color. Mind you, this is not high-quality printing that you'll use for your most important presentations. But when you need a hint of color in a pinch, it's a breeze to snap out the black cartridge and snap in the color cartridge. And unlike its portable ink-jet competitors, the Citizen PN60 doesn't force you to make the trade-off of using a composite black.

Slow Song If you suffer from speed greed, these printers are not for you. Designed first and foremost for portability, the Citizen PN60 and the PocketJet require single-sheet hand feeding and don't post any blazing benchmarks in the speed arena.

The best thing about the latest and greatest portable printers is that they won't break the bank. For about $339 you can take home the Citizen PN60. However, the thermal cartridges will run you $8.99 for two black ones and $13.99 for two color ones, and you'll need to shell out another $79 for the battery. This brings your total up to just under $500.

The PocketJet sells for about $365, and this includes the printer, battery, 100 sheets of thermal paper, and a handy carrying case. Extra paper will run you $7.99 for 100 sheets.

If your budget can take it, we recommend the Citizen PN60. It's a little heavier and bulkier than the PocketJet, but the capability to print on any type of media and the support for color make it worth the extra money. **KYLA K. CARLSON**



Movable Type: Portable printing takes on an entirely new meaning with the Citizen PN60 (top) and Pentax's PocketJet (bottom). At just over 1 pound apiece, you'll hardly notice that you've brought your printer along with you—until you print that closing contract.

Housekeeping In!	*Housekeeping In*
Filename: [month+slug+.NW]	**Filename:** [02minip.NW]

Proof on the Page: The output quality of both printers is fairly close. The PocketJet (left) forces you to use special—not to mention expensive—thermal paper, while the Citizen PN60 (right) can print on any media type. However, you'll see better results with the Citizen PN60 if you pony up for better paper.

Citizen PN60

USABILITY: *Easy setup, great Windows software.* ****
TECHNOLOGY: *Prints in color or black and white* ****½
VERDICT: *Pricey but more flexible.* ****

PocketJet

USABILITY: *Plug in the battery and print.* ****
TECHNOLOGY: *Requires special paper but no consumables.* ***
VERDICT: *The size and price are great, the special paper is a drawback.* ***

FILEBOX

Citizen PN60

Resolution: 360 dpi.
Cost Per Page: 30 cents.

$339 est. street price
Citizen America Corp.
(310) 453-0614
Reader Service No. 622

PocketJet

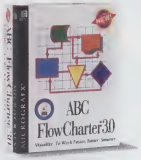
Resolution: 300 dpi.
Cost Per Page: 8 cents.

$365 est. street price
Pentax Technologies
(800) 543-6144
Reader Service No. 623

PHOTOGRAPH BY ARNOLD TODLEO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Best Selling.



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Circle 186 on reader service card.

NEC Captures the Rainbow

USABILITY: *High modularity saves a weak trackball and no CD-ROM drive.* ***
PERFORMANCE: *Not as fast as many, but your multimedia applications certainly won't dawdle.* ***
TECHNOLOGY: *The first notebook capable of rendering 24-bit images on a TFT display.* *****
VERDICT: *Finally, take your high-resolution graphics on the road.* ***½

In the race to make portable multimedia a reality, NEC has taken a detour. Ignoring the scramble to shoehorn a CD-ROM drive into its notebooks (see "Multimedia in an Overnight Bag," page 59), the company's new Versa M brings true 24-bit graphics to a superb TFT display—the first 5.5-pound machine to do so.

Don't need to view true-color images? Swap this display with the first TFT screen capable of 256 simultaneous colors at 800 by 600 resolution—an option most business users will find more practical, especially since it's $400 cheaper. Both displays can also take advantage of a virtual 800 by 600 resolution video driver that lets you pan through a document or graphic at that resolution. This helps compensate for the stingy real estate of a notebook display.

Easy on the Eyes NEC's new high-resolution and true-color screens bring good news to business presentations that feature engineering schematics or detailed diagrams, to multimedia training materials displayed on factory floors, and to a host of other applications.

Admittedly, audiences of more than four people will have trouble viewing the 9.5-inch screen. But you have the option of displaying your high-resolution images on a big-screen external monitor. No other portable lets you do this. Better still, you can display them on a TV via a VCR with NEC's optional Video Pak, which swaps out with the Versa M's floppy drive.

Indeed, the Versa M retains the trademark—and widely emulated—modularity pioneered by NEC's family of portables. The floppy drive has essentially become an external slot, accepting not only a second battery but your choice of a second Type III PC Card slot, two Type II slots, or any of several wireless communications options. Unfortunately, it won't accept a CD-ROM drive, though the machine is wired for sound: 16-bit audio with a single speaker and integrated microphone.

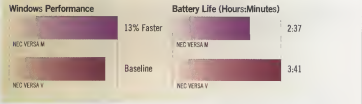
Well Stocked Otherwise the Versa M is easily up to snuff for power- and storage-hungry multimedia applications. A 75MHz or 100MHz DX4 is standard with 8MB of RAM (expandable to 40MB). The hard-drive options range from 250MB to 810MB (and the hard drive is removable, of course). And video runs on accelerated local bus, though in our Windows benchmark tests the Versa M lagged behind AST's Ascentia 900N, Texas Instruments' TravelMate 4000, and Dell's Latitude. But this is a trifle: The machine is still blisteringly fast.

Usability wins high marks as well, thanks to an excellent keyboard layout and long key travel. Still, we'd love to see the TrackPoint II pointing device that NEC licensed for its low-end portables migrate to the Versa M. The small front-mounted trackball now used is awkward. But for millions of businesspeople, the Versa M's high modularity and breakthrough video technologies more than outweigh this shortcoming. **MARTY JEROME**

Looking Good: While the Versa M's 16.7 million colors at 640 by 480 resolution are glorious, business users will likely prefer the optional high-resolution 800 by 600 display.

Color Costs: The true-color Versa M was 13 percent faster than its cousin, the Versa V. However, its battery life was more than an hour shorter than the Versa V.

True Color: Dazzling, But Draining



NOTE: WINSTONE 96 RUNS 19 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS. ZOGIT BATTERY RUNDOWN TEST MECHANICALLY SIMULATES KEYSTROKES

FILEBOX

Versa M

Competition: None—NEC is the first company to offer notebooks with true-color or 800 by 600 displays.

Features (as tested): 100MHz DX4, 8MB of RAM, 810MB hard drive.

Weight: 5.5 pounds.

Expansion: 40MB of RAM, up to 810MB hard drive, one Type III or two Type II PC Card slots, floppy drive swaps out for extra battery.

$6,799 est. street price
NEC Technologies
(800) 632-4636, (508) 264-8000
Reader Service No. 624

PHOTOGRAPH BY ARNOLD TOSEJO

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Ron Kimball Photography

Albany to Anchorage in 26 Seconds

Rand McNally's new *TripMaker*™ software for Windows™ can route you from Albany, New York to Anchorage, Alaska in 26 seconds flat. And to virtually anywhere in the United States, Canada and Mexico. *TripMaker* does more than just plan routes, it plans entire trips. Select your origin and destination and *TripMaker* will get you on your way. Or, *TripMaker* can suggest ideal car trips based on your personal preferences – region of the country, time of year, and more.

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System Requirements: Microsoft® Windows™ 3.1 or higher; EGA, VGA, or higher graphics card. DOS 3.3 or higher; 80386 or higher PC recommended. 4 MB RAM or more. Hard drive uses minimum 11 MB; 15 MB maximum for all databases.

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–Soft•letter 8/94

RAND McNALLY

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Circle 119 on reader service card.

The Positive Side to Scanning Slides

With all the talk about video on PCs these days, it's easy to forget that many of the images we'd like to funnel into our computers are static ones. But getting pictures from film to file requires a slide scanner, traditionally a tool reserved for graphics professionals.

Nikon changed the rules with its Coolscan slide scanner, a compact, easy-to-use, and relatively affordable model that yields high-quality digitized images from 35mm film. Now Coolscan has company in the form of a slide scanner from another big name in photography: Polaroid. And true to its instant-picture heritage, Polaroid's new SprintScan 35 does what the Coolscan does, only much faster.

Looking Sharp At first glance, the SprintScan 35 has much in common with the Coolscan. Both are optical scanners that can digitize 35mm slides in a single pass (compared to earlier scanners that used three passes, which is generally slower and less accurate). Both units cost about $2,500 and can scan almost any type of 35mm image—monochrome or color, positive or negative. And both make stunning 24-bit color copies at resolutions of up to 2,700 dots per inch.

The Coolscan and SprintScan 35 each scan in images using a film-strip holder. The scanning software resembles what's included with color flatbed and document scanners, with a prescan procedure and controls for brightness, contrast, color, focus, cropping, film type, and so on. Both models come with software that can act as a "plug-in" to Adobe's Photoshop (or compatible applications), but you needn't have a copy of Photoshop in order to scan.

Sliding in Colorfully: Nikon's Coolscan (left) and Polaroid's SprintScan 35 (right) turn 35mm slides into editable digital images for less than the cost of sending the slides to a service bureau. Capturing a color slide at maximum resolution takes about 10 minutes with the Coolscan and just 40 seconds with the SprintScan 35.

PICKS DESKTOP SLIDE SCANNERS

Time-tested but slow compact slide scanner	Nikon Coolscan
Fast and economical way to get slides onto your hard drive	Polaroid SprintScan 35

As for results, the Coolscan seems to do a slightly better job of getting the scan right on the first take, though both units are prone to mild distortions, color variations, and unwanted shadows. Such problems are usually easy to correct via software.

Fast Pass The SprintScan 35, on the other hand, sprints past its competitor when it comes to scanning speed. Capturing a color slide at maximum resolution takes a mere 40 seconds or so with this unit. Capturing the same image at the same resolution with the Coolscan takes much longer—about 10 minutes is required.

Neither slide scanner is for the faint of hardware: Images scanned at full resolution can occupy 28MB of disk space each. A 24-bit video setup is also advised. The SprintScan 35 comes with a SCSI-2 interface board, while the Coolscan includes a standard SCSI card.

Nikon's Coolscan and Polaroid's SprintScan 35 both do an exceptional job of getting 35mm film images into your PC at a justifiable price. The SprintScan 35 simply does the job a lot faster. CHRIS O'MALLEY

Coolscan

USABILITY: *Straightforward setup and software.* ****
PERFORMANCE: *Great results, but you'll have to wait for them.* ****
TECHNOLOGY: *Solid and proven, if a little resource hungry.* ****
VERDICT: *Once the leader, now runner-up.* ****

SprintScan 35

USABILITY: *Simple to set up and use.* ****
PERFORMANCE: *Superb scans at truly breakthrough speeds.* *****
TECHNOLOGY: *Innovative engine.* ****
VERDICT: *The best color slide scanner for under $3,000.* ****½

FILEBOX

Coolscan

Max. Resolution: 2,700 dpi.
Color Quality: 24 bit.
Scanning Time: Approximately 10 minutes at full resolution.
System Requirements: 16MB of RAM (32MB recommended).

$2,300 est. street price for internal, $2,600 for external
Nikon Electronic Imaging
(800) 526-4566
Reader Service No. 625

SprintScan 35

Maximum Resolution: 2,700 dpi.
Color Quality: 24 bit.
Scanning Time: Approximately 40 seconds at full resolution.
System Requirements: 16MB of RAM (32MB recommended).

$2,495 est. street price
Polaroid Corp.
(800) 816-2611
Reader Service No. 626

PHOTOGRAPH BY ARNOLD TIGNEZID

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

The OL410e prints presentation-level output at a simple-text-and-graphics price.

It's designed for laser class output so you can print great looking sales presentations, newsletters and direct mail flyers easily and affordably.

The LED printhead carries a 5 year limited warranty and the print speed is a fast 4 pages-per-minute.

And there's also a Mac version with Adobe PostScript — the OL410e/PS.

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Circle 118 on reader service card.

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New! HARDWARE: CD7 Minichanger

Put Another CD in the Jukebox

Until recently, Pioneer was a lone player in the CD changer business with its line of 6- and 18-disc CD jukeboxes. Now Mountain Network Solutions is seeing Pioneer's six discs and raising it one with the CD7 Minichanger, a drive that handles seven CD-ROMs.

Like the Pioneer DRM-602X, the CD7 Minichanger can read only one disc at a time; changing from one disc to another is automatic and takes a mere 10 seconds. The CD7 Minichanger takes an intriguing approach to loading its jukebox. While the Pioneer line has cartridges that you remove from the changer and fill with CDs, the CD7 Minichanger is studded with seven small buttons. Press one of them and a conventional CD tray slides out so you can load and replace discs one at a time. This method has advantages and disadvantages. Loading the CD7 Minichanger is easier than fiddling with Pioneer's disc holders. But with the Pioneer, a glance at the front of the cartridge tells you which discs are loaded.

Jammin': Tired of swapping CDs like floppies? Consider the CD7 Minichanger. It handles seven CD-ROM titles at a time so your favorite CDs are always at your fingertips.

All told, the functionality and performance of the CD7 Minichanger are not significantly different from the Pioneer DRM-602X. Both are dual-speed drives. The important difference is the extra disc slot the CD7 provides. The Pioneer DRM-602X jukebox sells for $349, while the CD7 Minichanger goes for $499—a difference of $150. Or look at it this way: The Pioneer DRM-602X costs about $58 a slot; the CD7 Minichanger costs about $71 a slot. If you have an array of seven CD-ROMs that *must* be available quickly, get the CD7 Minichanger. Otherwise, the Pioneer DRM-602X is a better buy. RON WHITE

USABILITY: *A handy-dandy way to easily juggle seven CDs at once.* ****
PERFORMANCE: *Seven CD slots, dual-speed performance.* ****
TECHNOLOGY: *Jukeboxes—a 1950s concept applied to 1990s media.* ****
VERDICT: *The price is justifiable only if you need quick access to more than six CD-ROMs.* ****

FILEBOX

CD7 Minichanger

Competition: Pioneer DRM-602X (which has only six CD slots, but costs $150 less).

System Requirements: SCSI adapter (not included), Windows 3.1 to use audio player.

Software Included: CD-audio and Windows disc-management utilities.

$499 est. street price
Mountain Network Solutions
(800) 458-0300, (408) 438-8650
Reader Service No. 627

MGA Impression Lite

Ticket to the Third Dimension

As graphics and video become more vivid on the PC, graphics cards are entering the third dimension, literally. Following the success of its MVP Award–winning MGA Impression Plus 64-bit 3-D graphics accelerator, Matrox has rolled out a version of it for the rest of us: the MGA Impression Lite. The new board delivers the same blazing Windows performance and onboard 3-D acceleration—for about $300.

The MGA Impression Lite supports resolutions up to 1,280 by 1,024 at flicker-free refresh rates. But the truly unique feature is the board's built-in 3-D acceleration. It won't turn your monitor into a hologram, but it does support virtually all 3-D application programming interfaces.

NOTE: WINBENCH 4.0 IS DESIGNED TO MEASURE GRAPHICS PERFORMANCE UNDER WINDOWS 3.1.

3-D Lite: Matrox's new board speeds Windows and 3-D apps.

The main differences between the MGA Impression Plus and Lite are upgradability and price. The Lite comes with only 2MB of VRAM and costs $100 less than the Plus. Either way, you won't be disappointed. They're the fastest accelerators around. They're also ready to carry you into the 3-D future. WENDY TAYLOR

USABILITY: *Excellent drivers and software.* ****
PERFORMANCE: *Unmatched Windows speed.* ****
TECHNOLOGY: *64-bit processor with 3-D.* *****
VERDICT: *A great upgrade for any desktop PC.* ****

FILEBOX

MGA Impression Lite

Competition: MGA Impression Plus.

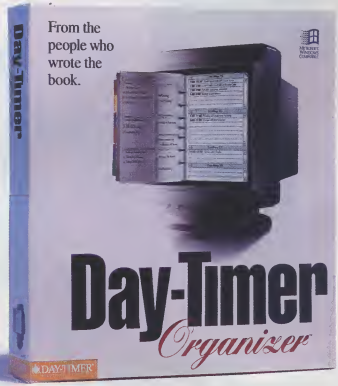
Features (as tested): 2MB of VRAM, PCI interface.

$300 est. street price
Matrox Graphics
(514) 685-7230
Reader Service No. 628

PHOTOGRAPH BY TONY ANDRUS

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

Only One Company Could Fit 47 Years Of Time Management Experience On A Disk.



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DAY-TIMER® TECHNOLOGIES

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Circle 178 on reader service card.

New! HARDWARE: SoundExpression 14.4VSp

Voice Mail on a Shoestring

Want to give your home office or business all the advantages of a corporate workplace? Boca Research's SoundExpression 14.4VSp is an add-in card that equips a PC with a sound card, a voice-capable fax modem, and an answering machine—all for a very reasonable $199.

With all this wizardry on a single card, you might think the designers skimped on something. Not so. The SoundExpression has a 16-bit Sound Blaster–compatible sound card powered by the crystal-clear OPL-3 chip set. In addition, the card comes with interfaces for most major CD-ROM drives and includes wave-table synthesis capabilities.

The most interesting feature of the SoundExpression is an embedded voice chip that functions as an answering machine and speaker phone. By using Global Village's included FaxWorks Voice and Data Communications software, you can set up your system to act as a voice mail system. The SoundExpression can handle up to 1,000 mailboxes that can be accessed individually from a touch-tone phone.

There's one caveat with the SoundExpression: hardware interrupt hassles. Each component on the board—sound card, CD-ROM interface, and modem—occupies a memory address and an interrupt. To Boca's credit, all of the components are software configurable, but you may still have to resort to some trial-and-error troubleshooting in order to make sure the right interrupts are available.

Installation quibbles aside, the SoundExpression is a great way to give a home office or small business voice mail on a shoestring. JOHN TASCHEK

Message Mate: Why clutter your desk with a fax machine *and* a phone? Boca's SoundExpression shoehorns both onto a single card.

USABILITY: *Interrupt settings configured through software, but it's not plug and play.* ★★★

PERFORMANCE: *The 14.4Kbps modem might seem dated if you're already eyeing V.34.* ★★★

TECHNOLOGY: *16-bit sound card, high-powered chip set, and embedded voice chip.* ★★★★

VERDICT: *The cheapest way to equip a small business with voice mail.* ★★★½

FILEBOX

SoundExpression 14.4VSp

Software: Midisoft's Sound Impression utility for controlling audio CDs and recording and editing WAV files.

Other Features: Optional microphone and speaker.

Boca Research
$199 est. street price
(407) 997-8227
Reader Service No. 639

Back-UPS 280

Supply for Your Power Demands

Check around and you'll find that most people who have purchased an uninterruptible power supply (UPS) have a story that goes along with it: a thunderstorm blackout, an electrician's brain lapse, or something to do with a car and a power pole. Nonetheless, most people consider buying a UPS only as an afterthought. But at $100, American Power Conversion's new Back-UPS 280 should be standard equipment on every desktop.

Connect your system to the Back-UPS 280, plug it into the wall, and relax. The next time the lights flicker and everyone else starts scrambling, you'll have plenty of time to save your data. The Back-UPS 280 is perfect for a system with a small monitor. If you have a 17-inch or larger monitor, or a large tower system, plan on one of the Back-UPS 280's big brothers, which are rated to 1,250 volt amps or more.

When the power fails, the Back-UPS 280 automatically kicks in, picking up where the power left off within 3 milliseconds. It then sounds an alarm that will beep every five seconds so you know where the juice is coming from. If the power failure continues long enough to drain the unit's batteries, it will sound a second (and louder) alarm to let you know it's time to shut down.

Not only is the Back-UPS 280 effective and affordable, it's designed to last. Expect the batteries to last between three and six years, at which time you can replace them. American Power Conversion even provides instructions on recycling the old batteries. As an added bonus, the Back-UPS 280 tests your system's wiring when you plug it in and will let you know if you need an electrician. Whether you have power failures or dangerous surges, the Back-UPS 280 provides the perfect protection. ADAM MEYERSON

USABILITY: *Plug your system in and you're covered when the lights go out.* ★★★★

TECHNOLOGY: *Bonuses include replaceable batteries and a test for faulty wiring.* ★★★★

VERDICT: *Low-cost insurance for warding off power disasters.* ★★★★

FILEBOX

Back-UPS 280

Suitability: Protects a desktop PC with a 14- or 15-inch monitor.

Warranty: Two years with the option to purchase another three years.

$100 est. street price
American Power Conversion
(800) 800-4272
Reader Service No. 630

PHOTOGRAPH BY ARNOLD TOSEJO

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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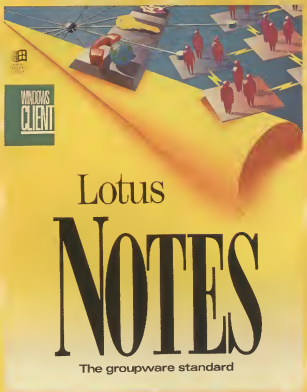

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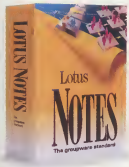

LOTUS NOTES. THE FOUNDATION FOR A NEW WAY TO WORK.

Welcome to The Source for Lotus Notes Solutions. This directory showcases some of the top providers of Lotus Notes-based business solutions. With over one million users, Notes is by far the leading groupware application in the marketplace today. Notes helps people get their jobs done faster and better, and it enables teams of people to work together more productively than ever before. Using its power to dissolve organizational and geographical boundaries, Notes makes it possible to run an efficient, distributed organization with satellite offices and mobile personnel all working with the same critical information.

While Notes is the most robust client/server platform available for developing and deploying groupware applications, its real value derives from its role as the foundation upon which you can build custom business solutions. And it is our rapidly growing force of over 7000 Lotus Business Partners worldwide that transforms this award winning groupware product into solutions that deliver an unprecedented return on your technology investment.

As you peruse this directory, note that it contains a cross section of Business Partners including application developers, consultants, service providers, education centers, system and network integrators, support centers and resellers. And right now, they are designing, customizing, implementing and supporting Lotus Notes-based solutions for companies just like yours. Solutions range from products that extend Notes, such as workflow and document management, to applications development and database tools, to complete business solutions for industries as diverse as health care, legal, pharmaceutical, insurance, manufacturing, retail, petrochemical, publishing and financial services.

Charles B. Hamlin
Vice President, Corporate Marketing

For a more complete listing of Lotus Notes services and products, call 800-828-7086, extension A384 and ask for your copy of The Lotus Notes Guide.

THE LOTUS NOTES DIRECTORY

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- **Banking/Financial Services**
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CASE STUDY

Coca-Cola Enterprises Inc.

The Atlanta-based corporate Human Resources department at Coca-Cola Enterprises assists local management in hiring middle-and upper-level personnel. In early 1994, the group began a search for a way to automate its resume tracking process. The group's search led to SkillSet Software Inc., a Lotus Business Partner. SkillSet has developed an applicant tracking system called Desktop Recruiter for Lotus Notes that is a series of Notes templates that work together.

"Before we had this system, if somebody sent a resume in response to a specific ad, and was not hired for that job, we had no easy way to get back to that resume if another position opened where that person might have been a good fit." says John Rains, Corporate Manager of Human Resources. "Since implementing the pilot we have hired people from the database."

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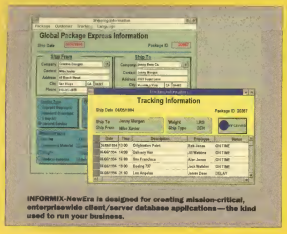

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Jeff Papows, Notes Product Division, Lotus Development Corp.:
"INFORMIX-NewEra offers Notes users the ability to build enterprisewide, client/server applications that extend the value of Lotus Notes."

Complex applications can be developed quickly, using class libraries provided by Informix and our partners. In fact, Informix has already signed up a number of class library partners, including Lotus Notes, as well as others for imaging, EDI, and more.

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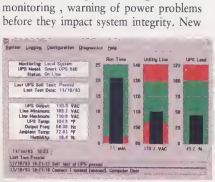

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CASE STUDY

Chase

With account managers in different cities around the world servicing the same international clients, Chase keeps everyone working together by integrating all client information in a Notes database called "Client Tracking". Now account service people all around the world, work from the same "live" qualitative information. From meeting minutes and issue discussions, to selected financial news service reports and loan profiles, every account manager is always up-to-speed. With over 3700 installations, Chase's CIO says, "Notes has revolutionized the way we collect, share and distribute information across the global enterprise."

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Source: "Lotus Notes: Agent of Change: International Data Corp., 1994

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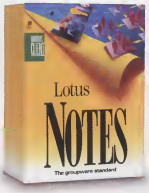

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To get started with Egghead Software's Lotus Notes Plus, call us at 1-800-EGG-1123. You'll find that Notes will help you empower your organization and Egghead will help you empower Notes.

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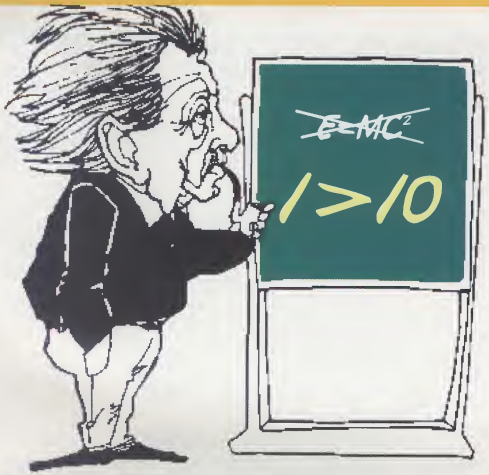

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CASE STUDY

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Your Blueprint to Lotus Notes® Success.

Workgroup Productivity Corporation® is a professional services firm specializing in Lotus Notes solutions. As a result of our extensive experience with large scale Notes engagements, WPC has developed the Rapid Application Deployment and Development,"RADD," Toolkit®. The RADD Toolkit® has been designed to assist companies in the deployment and development of Lotus Notes applications on a corporate-wide basis. The RADD Toolkit® consists of a suite of Notes databases including:

The **System Standards** database is designed to help the Notes roll-out team plan for the strategic growth of the Notes environment.

The **Development Standards** database provides a foundation for the Notes development team. This documentation database assists the developers in creating a common "look and feel" for all Notes applications.

The **Extended Formula Catalog** database is a compilation of formulas that WPC has compiled through its development projects. This application allows the developer to copy and paste Notes code, and thus expedite the development process.

The **Design Element Encyclopedia** database provides a management tool for depositing and approving key database elements in the corporate wide Notes environment.

The **Quality Assurance** database provides a means to administer the adherence of a Notes database to the standards that have been established in the Development Standards and Systems Standards databases. The QA database includes a submission form for a new Notes application which is sent to the Notes QA team.

The **Application Request** database allows the end-user to submit a formal request for a new Notes application. Once the request is submitted, the requester can check the status of the development effort and review the history of his/her request.

The **ID Organizer** database provides those responsible for the generation of new User ID's, a central storage facility for the ID files, and the initial passwords assigned.

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For more information on Workgroup Productivity Corporation's **RADD Toolkit®**, our professional service offerings, or for a copy of the **RADD Toolkit®** ScreenCam demo call 1.800.380.3806 extension 688.

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CASE STUDY

CBIS

CBIS initially adopted Lotus Notes as a more efficient way to grow and manage sales. Notes is the only database technology available that offers replication, a feature that enables traveling users to connect and instantly have access to all current information and messages. So sales people are on top of it no matter where they are. Staff and sales personnel also use Notes to enter status reports. This information is easily "rolled up" to provide managers at every level the up-to-the second information they need. Now CBIS has over 1800 Notes users throughout the corporation. Does it work? CBIS cites a significant increase in productivity and 81% of Notes users say their personal efficiency has increased.

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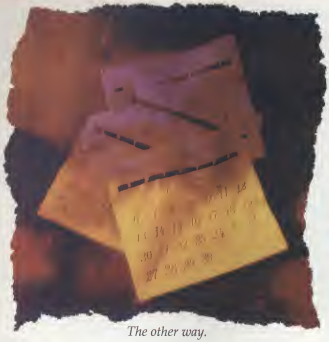

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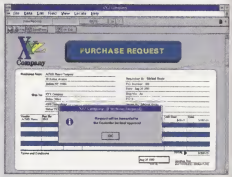

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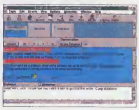

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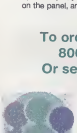

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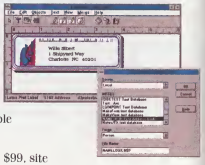

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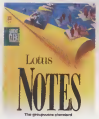

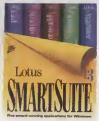

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SNEAK PREVIEW

There's a poker game you play every year, and at stake is a third or more of your income. But since the other folks at the table also get to bet with your hard-earned wages, no matter what happens, you're likely to lose. And to keep you on your toes, a good portion of the rules are rewritten every year. The name of the game? Filing your income taxes.

Fortunately, there are computer programs to help you even the odds. Intuit's TurboTax Multimedia and Block Financial Software's TaxCut have held most of the marketing cards for years. But new rivals putting a different spin on the old 1040 form this year include Computer Associate's Simply Tax and Kiplinger's Kiplinger TaxCut (which combines Block's TaxCut engine with financial advice from the *Kiplinger Tax Letter*).

Never Painless Every company advertises that its program makes filing your taxes easy. Uh-huh. The only easy way to prepare your taxes is to dump a shoe box full of receipts into the lap of a certified public accountant. But hiring an accountant doesn't make sense for everyone, and although all tax programs make you work, they're the best way to minimize your losses. They also make filing much easier than the pencil-and-paper method.

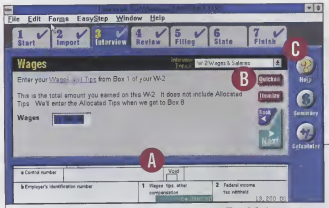
The four programs mentioned above share the same tax-filing basics: Windows environments, electronic versions of most federal and state tax forms, and IRS-approved electronic options. The key to tax success is help with figuring out the tax code, and these programs do that very well.

Every user is a novice when it comes to preparing taxes. Even if this is your tenth season with TurboTax, changes in tax laws and interface improvements mean that the program will be new for you, too.

All four programs have adopted some variation of a split-screen interface: Straightforward questions appear on one half of the screen, while the results of your answers appear on a tax form displayed on the other half. Likewise, all make extensive use of tabs to speed navigation. These programs are vastly improved over previous versions and couldn't be easier to follow. In fact, it's as though they were designed in the same room, with everyone looking over the others' shoulders.

Wanna Hold Your Hand This is the year of CD-ROMs, and TurboTax and both TaxCut programs use the 650MB discs to integrate more effective full-motion video explanations of IRS requirements into their interviews, along with tax-saving advice. While Simply Tax is the only one distributed on floppies, it carefully analyzes your answers to catch discrepancies, make suggestions, and point out overlooked deductions.

Tax help starts in these programs with explanations of what each IRS form is about and continues right through to the final review of your forms. Last year TurboTax only flagged data discrepancies; this year it discusses possible solutions, as does TaxCut. All of the programs point out this year's IRS hot buttons—sole proprietorships and moving



The Tax Man Cometh: Turn to TurboTax Multimedia for tax help. It includes an easy-to-use split screen view with tabs for easy navigation between tasks. Also on the CD-ROM version is money-saving tax advice in the form of full-motion video, and tight links to any personal finance information you might have in Quicken.

A. A **split-screen** view lets you hop between the interview (top) and the tax form being filled out (bottom).

B. This year's TurboTax has **tighter** links to Quicken than ever, providing radio buttons for data import wherever appropriate.

C. TurboTax has **tax advice and tax-saving tips** from former IRS auditor Mary L. Sprouse and Marshall Loeb, *Fortune* magazine's editor-at-large.

H&R Block at Your Service: Need more help than TaxCut can provide? Block Financial Software's version of the program includes a handy listing of local H&R Block offices where trained public accountants can answer your tax questions.

TurboTax Multimedia

USABILITY: *Split-screen view makes navigating a snap.* ★★★★★

VERDICT: *Our favorite tax helper.* ★★★★★

TaxCut

USABILITY: *Navigator tabs make it simple.* ★★★★½

VERDICT: *Easy way to handle a tough job.* ★★★★½

Simply Tax

USABILITY: *Straightforward but slow.* ★★★★

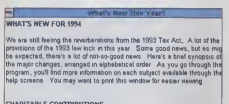
VERDICT: *Lowest price, no multimedia frills.* ★★★★

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

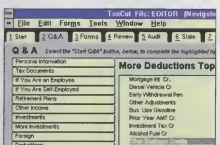
New! SOFTWARE: TurboTax, TaxCut, Simply Tax

SIDE BY SIDE

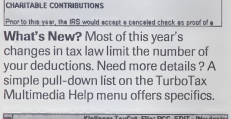
MAKE THE MOST OF A **TAXING** SITUATION



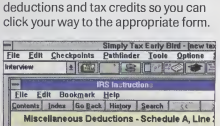
What's New? Most of this year's changes in tax law limit the number of your deductions. Need more details ? A simple pull-down list on the TurboTax Multimedia Help menu offers specifics.



Deduction Decisions: Block's TaxCut includes exhaustive lists of all possible deductions and tax credits so you can click your way to the appropriate form.



Taxing Advice: Can't speak the IRS's peculiar version of English? No problem. Kiplinger TaxCut has a bounty of context-sensitive advice from Kiplinger's own finance and accounting experts.



Reality Does Bite: Simply Tax includes real-life examples of various tax situations and how the IRS looked at them. It also offers tax advice for avoiding the IRS's scrutiny yourself.

expenses—and warn you if you're being more aggressive with deductions than most taxpayers. Typically, these alarms err on the side of caution.

Expert Advice The programs all offer an abundance of tax tips along the way and will audit your completed return, but each gets a different spin from a different in-house expert. TurboTax relies on the expertise of former IRS auditor and tax attorney Mary L. Sprouse, *Fortune* magazine Editor-at-Large Marshall Loeb, and more than 100 in-house experts.

TaxCut has always used the services of Dan Caine. But since Meca, its original developer, is now owned by the nation's largest tax preparer, TaxCut users can click on one of the TaxCut tabs and get the phone number of the nearest H&R Block office where trained professionals will field thorny tax questions. If you decide you need professional help after buying the program, the price of TaxCut can be applied toward the preparation fees at any H&R Block office.

The Kiplinger version of TaxCut relies on the expertise of the staff of the *Kiplinger Tax Letter*, while Simply Tax provides a series of detailed money-saving tips from *The Ernst & Young Tax-Saving Strategies Guide 1994*.

Choices Even after an extensive review of all four programs, it's hard to say which does a better job. TurboTax Multimedia stands out for its comfortable interface and tight links for importing data from Quicken. Instead of a blind data import, now you get a list of the Quicken categories that are about to be imported and an opportunity to make changes to the information before it's entered into TurboTax. However, all of these tax programs support import from all popular personal finance managers via the TXF format.

Each of this year's tax programs is a bargain, with Simply Tax being the cheapest. But SimplyTax costs in other ways: It ran slowly, even on a 66MHz 486DX2. We give TurboTax a slight edge (particularly for Quicken devotees), followed closely by TaxCut (either version) and Simply Tax—but any one of them will help you keep as much of your money as legally possible. **MIKE HOGAN**

FILEBOX

TurboTax Multimedia

System Requirements: Windows 3.1, 486 or faster, 4MB of RAM, 15MB of hard-disk space, dual-speed CD-ROM drive, sound card.

State Versions: 28 state versions available at $25 per copy.

$45 est. street price
Microsoft/Intuit
(800) 964-1040, (415) 322-0573
Reader Service No. 631

TaxCut

System Requirements: Windows 3.1, 486 or faster, 4MB of RAM, 8MB of hard- disk space, dual-speed CD-ROM drive, sound card.

State Versions: 23 state versions available at $25 per copy.

$24 est. street price
Block Financial Software
(800) 288-6322, (203) 255-1441
Reader Service No. 632

Kiplinger TaxCut

System Requirements: Windows 3.1, 486 or faster, 4MB of RAM, 6MB of hard-disk space, dual-speed CD-ROM drive, sound card.

State Versions: 23 state versions available at $25 per copy.

$24 est. street price
Kiplinger
(800) 235-4060, (202) 887-6400
Reader Service No. 633

Simply Tax 1994

System Requirements: Windows 3.1, 386 or faster, 4MB of RAM, 9MB of hard-disk space.

State Versions: 20 state versions available at $25 per copy.

$19 est. street price
Computer Associates
(800) 773-5445, (516) 342-5224
Reader Service No. 634

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The Compaq® Contura® Aero™ is everything a great 486 ultra-portable notebook should be. First of all, it's quite small. Only 10.25" wide, 7.5" deep, and 1.5" high. It's also very light, a mere 3.5 lbs.

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Circle 109 on reader service card.

New! SOFTWARE: Delphi95

Borland's Unambiguous Oracle

USABILITY: *Implementation is good, but it's still Pascal.* ★★★
PERFORMANCE: *Compiled apps are nearly as fast as those written in C.* ★★★★
TECHNOLOGY: *Not a new idea, but well done.* ★★★★
VERDICT: *A Visual Basic killer.* ★★★★★

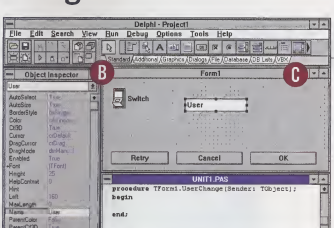
SNEAK PREVIEW

Programming, it's not just for the pocket-protector crowd anymore. First came Microsoft's Visual Basic, which made application development as easy as drawing. And now Borland's rapid application development tool, code-named Delphi95, goes one step further. It has all the major capabilities of Visual Basic, but it's object oriented, which makes it easier to reuse code across applications. It can also generate stand-alone executables, which are faster than Visual Basic's p-code applications. In short, Delphi95 is Visual Basic done right.

Drag-and-Drop Forms

Delphi95 uses the same principles of programming that Visual Basic uses: You create a form by dragging various types of controls onto it, then attach properties to them. Delphi95's form-design environment is very much like Visual Basic's with a few usability-enhancing twists. One of the nicest of these is the arrangement of the toolbars. Rather than creating one huge toolbar with all your tools—or worse, stacking a half-dozen toolbars down the side of your screen—Delphi95 uses tabbed toolbars: select the tab for the type of operation you want to perform, select the tool you want, then use it.

Delphi95 doesn't rely on Basic; it uses an object-oriented form of Pascal called Object-Pascal. In some ways, not using Basic is a liability, mainly because it's very easy to use. But Basic has a shortcoming: It's hard to take code from one application and use it in another. Why? Mostly because Basic is not object oriented. And since ObjectPascal *is* object oriented, you can reuse code easily.



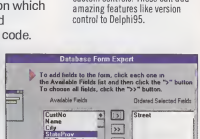
All the Right Pieces: Delphi95 has all the tools you'd expect from a visual programming tool—a form on which you draw, an Object Inspector, and an integrated development environment where you write your code.

A. Borland's Delphi95 **cuts desktop clutter** with its tabbed windows. Rather than stacking multiple toolbars down the side of the screen, tools are grouped by type under tabs. Likewise, the Object Inspector separates properties (such as button captions) from events (such as clicks).

B. You'll see a **toolbar bonanza** inside Delphi95. Tools are grouped according to their use, so all the graphics tools are available at the touch of a tab.

C. If you need **extensibility**, you can use VBX—Visual Basic custom controls. These can add amazing features like version control to Delphi95.

Fast Forms: The secret to programming with Delphi95 is to design your form first, then write the code that will make it do something. Delphi95's Database Form Expert generates rough forms by letting you browse the fields in database tables and select those you want on your form. The Database Form Expert also takes care of the logic for getting data out of the table.



You write ObjectPascal in Delphi95's integrated development environment (IDE)—a fancy term for a word processor designed to be sensitive to what you're writing. Borland's IDE is one of the better ones we've seen, with many clever tricks to help you along. For example, as you write code, the IDE puts keywords in boldface type and changes the color of words surrounded by braces—such as { and }—so you know when you've closed your comments properly.

Tool Shop Although Delphi95 can generate any kind of application—in fact, parts of it were written in Delphi95—it's best for creating data access tools. It works with most major databases, including Oracle, Sybase, and Informix, as well as most desktop databases. And the program comes with a local database server based on Borland's InterBase engine so you can test your applications without actually having to query the corporate database.

This feature gives Delphi95 a significant advantage over its competitors. It combines the best of an industrial-strength programming language like C++ with the ease of use of a graphical development environment like Visual Basic. This is one product anyone interested in programming should try.

JOHN MONTGOMERY

FILEBOX

Delphi95

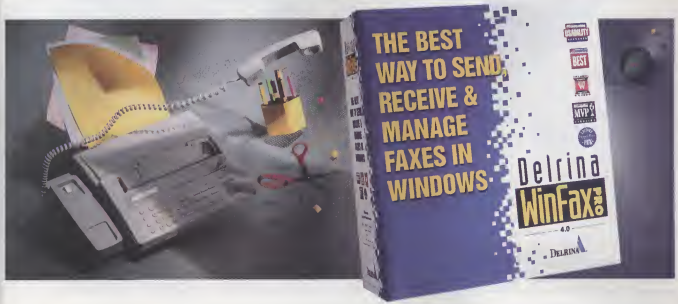
Competition: Microsoft's Visual Basic, PowerSoft's PowerBuilder, Computer Associates' CA-Realizer, TopSpeed's Clarion for Windows.

System Requirements: 4MB of RAM (8MB for Client/Server Edition), 27MB of available hard-disk space (minimum), 80386 or faster, Windows 3.1.

Price not determined
Borland Int'l.
(800) 331-0877, (408) 431-1000
Reader Service No. 635

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Introducing Delrina WinFax PRO™ 4.0. You'll wonder how you ever faxed without it.



Meet the fastest, easiest, most convenient way ever to handle all your faxing – new Delrina WinFax PRO™ 4.0, the latest version of the best-selling fax software in the world. The only one that combines the advanced faxing features you need with astonishing new ease and usability.

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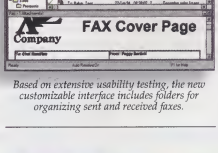
There's added convenience with dozens of ready-to-use cover pages. Fax phonebooks that are drag-and-drop simple. And improved fax annotation tools that even let you add your signature.



Based on extensive usability testing, the new customizable interface includes folders for organizing sent and received faxes.

Don't try this with a fax machine.

Imagine faxing, not just an image of a document, but the actual file itself*, so it's ready to be used in an application. Imagine sending a single document that is automatically faxed to some people and e-mailed to others.

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*Requires Class 1 modem.

Circle 167 on reader service card.

New! SOFTWARE: Premiere 4.0 for Windows

USABILITY: *Not an easy subject to grasp, but not a tough product to learn it on.* ★★★★
TECHNOLOGY: *More compression, playback, and media options than most people need.* ★★★★
VERDICT: *The best way to edit professional-level video under Windows.* ★★★★

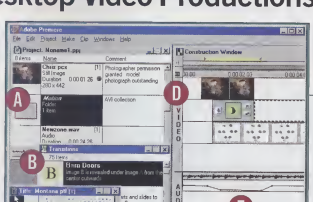
Take Two! Desktop Video Productions

You know that to survive in today's cut-throat world of business you need compelling video clips for online presentations, promotional videos, and other high-profile methods of persuasion. If you have the marketing budget, it's best to leave it to the professionals and avoid the hassle of doing it yourself. But with a modicum of video production talent, decent source material, and Adobe's Premiere 4.0 for Windows, you can do it in-house without cheesy-looking results.

The first Windows releases of Premiere—1.0 and 1.1—reflected the status of the PC as a video editing platform: primitive but with potential. This latest release of Premiere leapfrogs two increments and catches the newest Mac release.

Not for Kids In moving to a Mac-strength release, Premiere for Windows loses some of the general appeal it once had. This is not the sub-$200 test-drive product it used to be. It's more than twice the price now and adds features that professionals want but novices will find unfamiliar, such as support for edit decision lists (EDLs) and Society for Motion Picture and Television Engineers (SMPTE) time code. There's also output to the true frame rate of the National Television Standards Committee (NTSC)—29.97 frames per second (fps), not the rounded-up 30 fps.

But the added professional-strength features don't overburden the program's ease of use. Video editing is not for the timid, but Premiere's six main tracks—two video, one overlay, one transition, and two sound—give you a screen-sized workspace that hides the real power. You can now run 99 graphics tracks, including animated titles made within the program and custom transitions and filters made in the Transition Factory and Filter Factory modules.



Making Movies: Pick any part of making a video clip and Premiere can handle it, from titling and transitions to adjusting audio. That many elements can clutter the screen, but they're easy to access.

A. Premiere's **Project windows** can now contain media folders to help sort out the type of source files in your project.

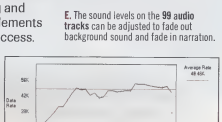
B. The enhanced **Transitions collection** includes a utility that helps you build your own transitions.

C. New to this version is the **moving title builder**, with a wide range of tools for customizing text attributes.

D. Improved previewing lets you **preview at a glance** before you build your movie.

E. The sound levels on the **99 audio tracks** can be adjusted to fade out background sound and fade in narration.

Peak Out: The worst fate for your movie is jerky playback on your audience's PCs. Fortunately, Premiere's Data Rate Graph (the only one of its kind) for AVI files lets you map a clip's data rate to ensure that the files you create and distribute don't top out your audience's systems.



Project Management As with previous releases, projects are organized around a single window that contains a palette of all the files that make up your video production—TIFFs, AVIs, MOVs, whatever. Version 4.0 lets you sort similar files into folders within the project window for easy navigation of your source material.

Faster and more easily customized previews and a handy trimming window are little usability touches that make all the difference. And for heavy-duty production you can now use your choice of EDL formats, including CMX 3400, CMX 3600, and Sony BVE.

Sound like overkill? Adobe will continue to bundle a limited version of Premiere with low-cost video capture boards. For a while, it will be called Premiere 1.1 for Windows, but this will be superseded by a limited-edition Version 4.0 that cuts out support for EDLs, field processing, batch capture, time codes, and other professional-level tools.

Do you need Premiere 4.0 for Windows? The truth is that many people don't. In fact, most users would probably be happier with a quick-and-not-so-dirty tool like Asymetrix's Digital Video Producer (formerly Splice) or an earlier version of Premiere. But if you're committed to video production on the Windows platform, Premiere 4.0 for Windows is the best entrée. **MATTHEW LAKE**

FILEBOX

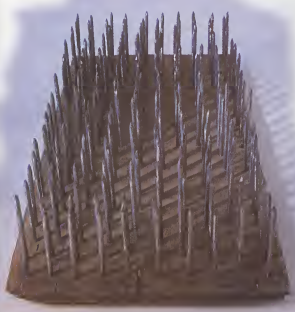
Premiere 4.0 for Windows

Competition: Asymetrix's Digital Video Producer 2.0 (formerly Splice), ATI's MediaMerge, TouchVision's CineWorks, and D/Vision Pro—but Premiere leads in professional-level tools and cross-platform development.

System Requirements: Fast 486 or Pentium, 8MB of RAM, Windows 3.1, minimum 256-color display adapter.

$595 est. street price ($179 for upgrade)
Adobe Systems
(800) 833-6687, (415) 961-4400
Reader Service No. 636

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*



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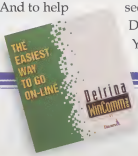

December 1994

May 30, 1994

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Circle 284 on reader service card.

Taking Inventory of QuickBooks

USABILITY: *Easy access—even for the novice.* ★★★★★
TECHNOLOGY: *Groundbreaking inventory management and auditing.* ★★★★½
VERDICT: *A complete small-business accounting package for the price of lunch.* ★★★★★

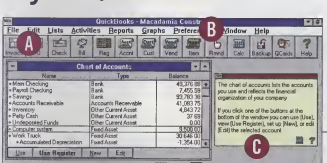
Considering that 70 percent of American businesses operate with fewer than five employees, it's easy to see why so few can find room on the balance sheet for an accountant's salary. In more than half the cases, it's the business owner who wears the green eyeshade, and that's made Intuit's QuickBooks for Windows extremely popular among entrepreneurs smart enough to use a PC for bookkeeping. But the lack of an inventory module in QuickBooks has been a stumbling block for product-oriented businesses—until now.

The main enhancement to Version 3.0 of QuickBooks for Windows is an inventory management system as robust as it is flexible. Reflecting the real world, QuickBooks 3.0 lets you record receipt of goods regardless of when you receive the bill. You can have multiple orders arrive at your business in a single delivery or split up a single large order into multiple shipments. You can also apply multiple shipments against a single purchase order or vice versa without keeping a library of Post-it notes to remind yourself to fix these entries later. And QuickBooks tracks goods on order, as well as those on hand, and lets you keep tabs on the inevitable short shipments so you can follow up with these vendors later.

Accounting Undo You can change what you like—as often as you like—without getting lost in QuickBooks. A new audit trail records all changes alongside the original entry, making it possible to quickly reconcile any account imbalances. As in Quicken, you do most of your work in familiar forms—invoices, bills, checks, and check registers—all of which are customizable on the fly without resorting to a forms designer. Numerous ease-of-use features get you out of QuickBooks and back to your real job fast. This version automatically calculates and tracks finance charges, vendor discounts, and reimbursable expenses. Ditto for taxes on invoices, even from multiple tax jurisdictions. And QuickFill eliminates repetitive data entry by filling in the blanks of known fields as you begin entering letters.

What's Right for You? Quicken still provides all the bookkeeping that most home offices or sole proprietorships need. You should pay the $80 or so more for the work-alike QuickBooks only if your business requires extensively customizable invoices, flexible inventory management, and job costing. QuickBooks still lacks Peachtree Accounting's integrated payroll (Intuit's QuickPay 3.0 for Windows is $49 extra) and PIM features such as phone books and to-do lists. Peachtree Accounting also puts some handy executive information tools within easy reach.

But with just a little extra work, you'll find still more exhaustive views of your balance sheet, P&L, inventory, and other critical business indicators among QuickBooks' 60 ready-made QuickReports and 15 business charts (these two types of documents differ more in style than substance). One thing for sure, the control that QuickBooks gives you over your books makes it better than having an accountant on staff—and a lot cheaper. MIKE HOGAN



Held Accountable: If you're not already using accounting software to keep track of your home office or small business, consider Intuit's QuickBooks 3.0 for Windows. Its easy-to-use interface and wealth of features (including a new inventory module) set the standard for products in this class.

The Great Audit Hunt: QuickBooks' flexibility is complemented by an audit trail of every transaction you've ever made so you can quickly reconcile account imbalances. QuickZoom, borrowed from Intuit's best-selling Quicken, lets you dive down through successive layers of data to explore where an inaccurate entry came from.

A. QuickBooks lets you **mix products with services** on your invoices by selecting an inventory item from a drop-down box.

B. The program includes **invoices appropriate to your business type,** but they're broadly customizable.

C. Optional pop-up **QCards** walk you through transaction options every step of the way.

FILEBOX

QuickBooks 3.0 for Windows

Competition: BestWare's M.Y.O.B. and Peachtree Accounting 3.0 best it in advanced features, but QuickBooks still leads in usability.

Minimum System Requirements: 386SX, 4MB of RAM, 9MB of hard-disk space, Windows 3.1, modem (for online services).

Support Policy: Unlimited, lifetime toll-free support.

$99 est. street price
Intuit
(800) 624-8742, (415) 322-0573
Reader Service No. 637

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

Tolstoy became infuriated whenever asked to edit or revise his work. Reminds us of someone using our competitors' flow charting software.

Leo Tolstoy had a standard reaction to editors' revisions: unbridled rage. And we can hardly blame him since we all know what a pain revising and editing can be – especially if it's a complex flow chart you're working on. That's the beauty of new allCLEAR III™ for Windows. Whether your changes are minor or major, now you can drag and drop complete flow chart structures like two-way decision points or multiple choices anywhere you like. And, unlike Visio™ or ABC FlowCharter,* allCLEAR III intelligently redraws and aligns every step in your chart for you.

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New! SOFTWARE: NotesSuite

Lotus Sweetens a Suite Deal

USABILITY: *Supplied databases are easy but building your own can be a headache.* ***
TECHNOLOGY: *Notes puts NotesSuite ahead of others, just don't stray from the Lotus fold.* ***
VERDICT: *Great integration and version control—at a premium.* ****

If you haven't taken the plunge into the world of application bundles, Lotus is sweetening its deal with NotesSuite. Not only do you get the five applications found in SmartSuite (Lotus 1-2-3, Ami Pro, Freelance Graphics, Organizer, and ScreenCam) but you also get Notes Version 3.2 and a collection of ready-made Notes databases to keep your workgroup in sync.

The NotesSuite Application Collection is particularly useful for corporations. Within these Notes application databases, you can take advantage of Notes/FX, Lotus's avenue for sharing information among applications and documents. But unlike OLE, which lets you share data with any Windows OLE-compliant application, Notes/FX integration is currently limited to SmartSuite applications.

Databases to Go The NotesSuite Application Collection contains a handful of databases that are ready to go (that is, provided their structure matches your company needs). The Contact Manager database is designed to keep you on your toes, down to the last payment-overdue letter. The Expense Authorization database gives you the power to track business expenses electronically before and after they happen through Notes and a link to 1-2-3.

The other business-oriented databases include Workgroup Documents for sharing, collaborating, and editing documents; and the Customer Suggestions database for tracking complaints, ideas, and correspondence status.

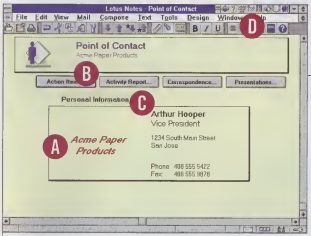
The Desktop Data News Service and News Forum and the One Source Competition Monitor serve as information databases. The "news service" is just a teaser—it's a collection of articles and an offer to subscribe to the news (via *USA Today, Financial Times,* and Industry News).

Finally, the SmartMaster Library and Freelance Presentation Library serve as storage centers for documents, templates, and presentations. As documents are edited, Notes updates the databases to reflect who last made changes and when they were made.

Free and Easy If you already have a feel for how Lotus Notes works, you'll be right at home with NotesSuite. Manipulating existing information, such as renaming fields or rearranging items, is straightforward. But if you need to redesign any database completely, then set aside a big chunk of time and brush up on LotusScript (the underlying programming language). You could be in for a rough ride.

One critical application you won't find in NotesSuite is a group scheduler. Instead, you'll have to rely on the networking features of Organizer 2.0 (see "Lotus Gets It Together—Simply," page 118).

If you're already a Notes house, NotesSuite will simply be more of a good thing. But if your company isn't currently using SmartSuite and you're not missing a central database and version tracking, there are few reasons to switch. KYLA K. CARLSON



Keeping Contacts: NotesSuite's Contact Manager database lets you track your conversations and correspondence with clients. It's just one of several databases available with NotesSuite.

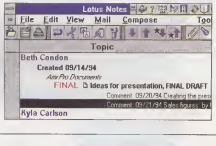
A. Each contact in the Contact Management database has a **business card** that's the starting point for updating information.

B. From within your database, you can easily update and modify contacts as necessary. Just click on one of these **ready-made icons** and jump right in.

C. Don't forget an important client's birthday. Click here for **personal information** about a contact.

D. As within all SmartSuite applications, **SmartCenter** remains accessible at any place you choose on your screen.

Directing Traffic: The Workgroup Documents database keeps reports, templates, presentations, and other documents accessible for sharing and collaboration. You determine who has editing rights, and Notes tracks who makes changes and keeps copies of every version for later review.



FILEBOX

NotesSuite

Competition: Microsoft Office and PerfectOffice—though neither can compete with Notes' integration.

System Requirements: 386 or higher, Windows 3.1, 8MB of RAM, client requires 73MB of hard-disk space or access to a network files server, additional space required for optional features.

$995 est. street price for NotesSuite Starter Pack, $585 per site for Standard Edition
Lotus
(800) 343-5414, (617) 577-8500
Reader Service No. 618

Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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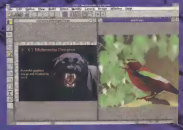

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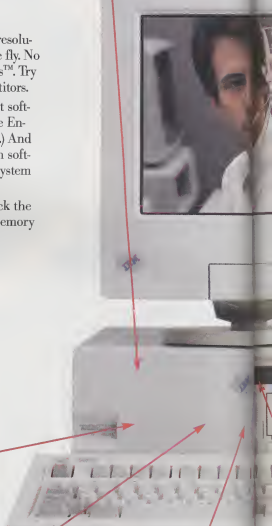

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USABILITY: *Clarifies legalese for a third of what your lawyer bills hourly.* ****
TECHNOLOGY: *Hypertext links need work.* **
VERDICT: *Case closed—call Teneron before you call your lawyer.* ***

First the bad news: LegalPoint won't replace your lawyer any more than accounting software will eliminate your accountant. The rest is mostly good news. Teneron's LegalPoint gives business users a lawful head start by providing templates for 70 common contracts and legal documents. The program also includes context-sensitive help and useful advice from a team of lawyers.

When you ask lawyers to draw up traditional business documents, they don't start from scratch. They take existing text in templates and fill in the blanks. But who needs a law degree to fill in blanks? LegalPoint makes it easy for you to write in the details by highlighting parts of its boilerplate documents. When you place the cursor over this highlighted text, the program explains the clause in question.

Red-Letter Days Red highlights indicate where to make changes specific to the document. If you're creating a promissory note, clicking on the Borrower explains that LegalPoint assumes a borrower is an individual, though it could be one of six other possibilities, including a corporation or general/limited partnership. Green text indicates subtext relating to the general topic.

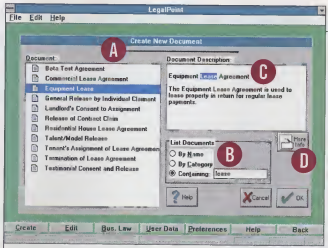
Filling in these blanks ultimately creates a basic—though not final—legal document that you can then take to a lawyer for input. Naturally, no collection of computer code will eliminate the need for wise counsel, but this program can reduce the amount of time (and money) you must spend with folks who charge megabucks per hour.

LegalPoint is more than a time-saver. The information in its dialog boxes is written in clear, understandable English. If you're mystified by what you're reading, click on the icon labeled Business Law Topics, and a context-sensitive database of background information appears. In the six categories—business, employment, corporate, intellectual property, financial, and legal—you'll find 56 articles written by Teneron's staff of lawyers and laypeople.

Keyword Chaos LegalPoint's one failing relates to its linking abilities. The opening screen, with a background of a table in a law library, shows six simple choices. When you click on Create a Document, you can choose a document template by name, category, or keyword. Even though the titles of the documents are clear and helpful, Teneron needs to work on linking its keywords to documents. For instance, if you use such obvious terms as *taxes*, *finance*, *default*, *insurance*, *liability*, and *harassment* as keywords, no document template comes up even though there are templates related to them.

Otherwise, LegalPoint features a briefcase full of nice touches. You can adjust the toolbar to resemble either Microsoft Word or Lotus's Ami Pro (but not Novell's WordPerfect). Its help icon is a life preserver, and the six choices on the opening screen are duplicated in a handy button bar.

Overall, it's an open-and-shut case in favor of LegalPoint. The program takes a process most people find fraught with anxiety and transforms it into a simple matter of filling in the blanks. HOWARD BALDWIN



Barrister in a Box: LegalPoint lets you find document templates by name, category, or keyword. When you click on the document template, the box in the upper right explains the purpose of the document.

A. On the **Create New Document** screen, you can choose from documents in this box by name in alphabetical order, by one of six categories, or by using a keyword.

B. Seeking **keyword references** is easy, but LegalPoint needs to better link this box with its contents. A logical keyword like "liability" should suggest a document to work with.

C. The keyword shows up highlighted in the **Document Description box,** which explains the content of the document.

D. **Additional information** is a simple button click away.

Eyes on the Green: LegalPoint's 70 editable documents display text in different colors. Click on the green to see explanatory subtext and on the red to see what to fill in.

FILEBOX

LegalPoint

Competition: Parsons Technology's It's Legal 5.0, Nolo Press's series for wills, living trusts, partnerships, patents, and incorporation.

System Requirements: 386 or higher, 5MB of hard-disk space, 4MB of RAM, Windows 3.

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Guide to the Ratings: ***** *Excellent* **** *Good* *** *Acceptable* ** *Poor* * *Unacceptable*

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- 1-YEAR WARRANTY
- 30-DAY MONEY-BACK GUARANTEE

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intel inside

*[1]Pricing is not discountable. *Guarantees available in the U.S. only for registered owners of Dell Latitude systems purchased after 8/8/94. [2]For a complete copy of our Guarantees or Limited Warranties, please write Dell Computer Corp., 2214 W. Braker Lane, Bldg. 3, Austin TX 78758. [3]Business leasing arranged by Leasing Group, Inc. **Prices and specifications valid in the U.S. only and subject to change without notice. The Intel Inside logo is a registered trademark and x86, IntelDX2 and IntelDX4 are trademarks of Intel Corp. Dell declares proprietary interest in the marks and names of others.* © 1995 Dell Computer Corp. All rights reserved.

New! SOFTWARE: dBASE 5.0 for DOS

The Case for the Other dBASE

USABILITY: *Still a better DOS database for developers than end users.* ★★★
PERFORMANCE: *Slow to start, but speedy queries.* ★★★★
TECHNOLOGY: *Event-driven or procedural apps—choose your weapon.* ★★★★
VERDICT: *A better value now that the compiler is included.* ★★★★

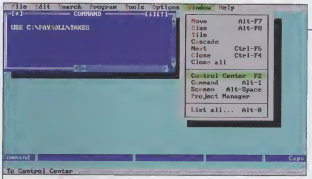
With all the attention that's been garnered by dBASE for Windows, it may come as a surprise that Borland has released a new dBASE product for the DOS platform as well. Completely rewritten and borrowing from the Windows version, dBASE 5.0 for DOS brings the venerable DBMS back into the database race.

A 32-bit DOS extender lets dBASE 5.0 run twice as fast as its predecessor, dBASE IV Version 2.0. And the Desktop, a new user interface with pull-down menus, resizable windows, and context-sensitive help, is a significant improvement over dBASE IV's unintuitive Control Center.

Plus, dBASE 5.0 includes enhancements to the dBASE language. Among these are For-Next loops, a command for creating new structures from scratch, and functions for handling arrays. New interface objects, such as radio buttons and list boxes, let developers create event-driven programs (though the character-based implementation will probably disappoint anyone who has seen a Windows screen).

Whether developers choose to rewrite existing dBase applications or recompile them with dBASE 5.0 for the speed gain, now they won't have to pay for the privilege: Unlike past versions, this one includes a compiler and linker in the box.

For those who are still committed to dBASE for DOS as a platform, Version 5.0 is a clear upgrade. ROGER W. SAUER



Look Ma, No Dot Prompt: Borrowed from dBASE for Windows, the DOS version's Command window replaces the dot prompt as the center of activity.

FILEBOX

dBASE 5.0 for DOS

Competition: FoxPro 2.6 for DOS, DataEase 4.53 for DOS & OS/2, and DataFlex 3.05c for DOS compete in the DOS realm, but most developers are turning to Windows.

System Requirements: 386SX or higher, 4MB of RAM, 11MB of hard-disk space, DOS 3.3 or higher.

$500 est. street price ($149 upgrade)
Borland Int'l.
(800) 336-6464, (408) 431-1000
Reader Service No. 641

Accent

GATT Got Your Tongue?

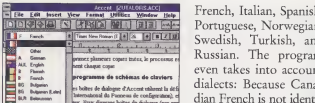
USABILITY: *Even the menus and interface can be tailored to different languages.* ★★★★
TECHNOLOGY: *Writes the book on multilingual word processing.* ★★★½
VERDICT: *An indispensable tool for multinational businesses.* ★★★½

English may be the lingua franca of business, but if your clients are in Europe or South America, you can't always rely on it. That's where Accent, a multilingual Windows word processor, comes in handy.

Accent is a unique tool for the international businessperson. It lets you mix text in several languages in the same document, run spelling checkers and automatic hyphenation on an entire document, even translate single words. True, you can type accented vowels and other foreign characters in any Windows word processor, but it's not always easy to do. In addition, conventional spelling checkers choke on words like *garçon* or *fräulein*.

You'll find support for 34 languages and 5 alphabets in Accent, including German, French, Italian, Spanish, Portuguese, Norwegian, Swedish, Turkish, and Russian. The program even takes into account dialects: Because Canadian French is not identical to Belgian or Parisian French, and Iberian Portuguese is not the same as the variety that's used in Brazil, Accent prompts you to select both a language and a country when you're switching tongues.

If your company does business around the globe, Accent will be a boon to your productivity. YAEL LI-RON



Parlez Vous? Accent lets you create and spell-check documents in 34 languages.

FILEBOX

Accent

Competition: Gamma Productions' UniVerse for Windows.

Utilities Included: Berlitz Interpreter.

$299 est. street price
Accent Software Int'l.
(800) 535-5256
Reader Service No. 642

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

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JMS-PC2.32994

1-800-810-0130

Circle 184 on reader service card.

New! SOFTWARE: Organizer 2.0

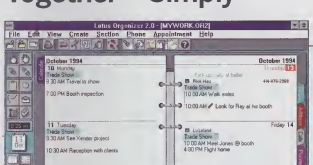
Lotus Gets It Together—Simply

USABILITY: *Straightforward calendar-style design sets the standard for PIM simplicity.* ★★★★½
TECHNOLOGY: *Powerful new network group-scheduling features.* ★★★★
VERDICT: *Lacks the cross-referencing features of some PIMs, but makes up for it in usability.* ★★★★

SNEAK PREVIEW

Lotus's Organizer has a reputation for warm, fuzzy simplicity, not for powerful PIM prowess. But Organizer 2.0 changes all that. Lotus has added network connectivity and scheduling features without sacrificing the program's comfortably familiar daily interface.

For workgroups that need to organize and schedule their meetings across a network, Organizer does the job easily. It analyzes everyone's calendars to determine availability and even takes into account resources such as meeting rooms. If the necessary people or resources aren't available, you can have Organizer find the next available time, use cc:Mail or Lotus Notes to alert each attendee about the meeting, and update this information in everyone's calendar.



Organize Your Day: Organizer's calendar view gives you instant access to your appointments, as well as action items from other Organizer sections.

If you're on the phone a lot, you'll appreciate Organizer's new log for managing phone calls. Simply double-clicking on an address-book entry brings up more detailed information on the contact.

Organizer 2.0's network scheduling features are a welcome enhancement, though the program still lacks database sorting and searching features.

Organizer has matured with age and now has solid group-scheduling power and a healthy number of PIM features. If you don't need the cross-referencing capabilities of a product like PackRat, Organizer 2.0 is a great choice. DAVID HASKIN

FILEBOX

Organizer 2.0

Competition: Borland's Sidekick, Individual Software's AnyTime, and WordPerfect's InfoCentral offer similar features but lack Organizer's friendly interface.

Minimum System Requirements: 386SX or faster PC, 8MB of hard-disk space, Windows 3.1 or later.

$119 est. street price
($39 for upgrade)
Lotus Development
(800) 343-5414
Reader Service No. 643

askSam 2.0 for Windows

The Nonconformist's Database

USABILITY: *Familiar word processor-style interface, zero learning curve.* ★★★★
TECHNOLOGY: *Fast, efficient search engine, OLE compliant, nifty import filters.* ★★★★
VERDICT: *A simple, elegant free-form information manager.* ★★★★

Maintaining a database is a pain in the neck. For taming information overload, however, it's a necessary evil. AskSam Systems' askSam 2.0 for Windows frees you from the constraints of traditional structured databases by letting you enter and sift through information in a way that's not too different from using a word processor.

To create a new infobase in askSam, just start typing—there's no need to designate fields unless you want to. And once you enter your free-form data, you can sift through it using Boolean searches, create reports, and generate stats. The program is ideal for managing structured data like contact information as well as for tasks like jotting down notes.

Where askSam really shines is in its import features. It reads existing database files in all the major word processing and database file formats, but it can also import Lexis/Nexis files and CompuServe Information Manager messages so you can create a database of your CompuServe correspondence.

Whether your information is simple, structured, or random, askSam provides an easy way to stash it—and an easy way to find it again. Best of all, since it behaves like a word processor, you won't spend weeks learning to use it. YAEL LI-RON

Sort Your Mail: askSam now includes a WinCIM import filter for searching and sorting your incoming and outgoing e-mail.

FILEBOX

askSam 2.0 for Windows

Competition: Phantech Software's InfoRecall on the low end, and Folio's Folio Views on the high end.

$140 est. street price
askSam Systems
(800) 800-1997
Reader Service No. 644

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

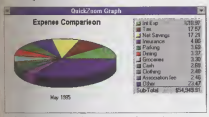
"Now that we know where our money is going, we're on our way!"

John Marshall
Nancy Marshall

"We're planning our second vacation this year! Quicken showed us how."
John Marshall, freelance videographer, with his wife Nancy, son John Glenn and Whiskers the dog, Austin, Texas.

John: "Before Quicken, doing the finances was truly painful. I still remember how many boxes full of bills and paperwork we used to have!"

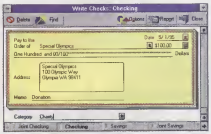
Nancy: "Now life is a whole lot easier with all our bank accounts, loans, credit cards and investments together in one place — on Quicken!"



"The charts and graphs allow us to instantly see what money's coming in and where it's going with just a mouseclick."

John: "We're finally in control of our money, because now we know where it's going. There's never a question of who's spending what or when. The charts and graphs tell us exactly how much money goes to the groceries, children's clothing, insurance, you name it — it's quite an eye opener."

Nancy: "We were up and running with Quicken right away. Didn't even open the manual at first. We reconcile our accounts to the penny — in just a few minutes. Last year, we did the taxes in an hour and a half, then used the free time to go to the movies!"



"Paying the bills is a piece of cake. Quicken's checkwriting screen looks and works just like our old paper checkbook."

John: "Everyone can afford Quicken."

Nancy: "We tell our friends you can't afford not to have it. We're going to get our kids going on Quicken the second they have a bank account, so they know where their money is going from day one. We should have been so lucky!"

Try Quicken for just $9.95

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ext. 810 057
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Features vary

Organizes finances painlessly.

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PC MAGAZINE EDITORS' CHOICE
August 1994
TM4000M/25

SERVICE & RELIABILITY PC MAGAZINE READERS' CHOICE
July 1994

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Circle 162 on reader service card.

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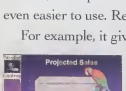

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New! NETWORKING:

CorStream Server • Collaborative • Motorola 326XFast

USABILITY: *Hassle-free installation, easy Net surfing for Windows users.* ★★★★★

TECHNOLOGY: *Unique in its class thanks to multithreading and OLE 2.0 compliance.* ★★★½

VERDICT: *Very few limitations, the best Windows Net suite money can buy.* ★★★★½

InternetWorks

Surfing Cyberspace in Suite Style

SNEAK PREVIEW

If you're still looking to catch the big Internet wave, you'll find that Windows Internet suites are as plentiful as Republicans in Congress. But BookLink Technologies' InternetWorks stands a notch above all other products with its complete multithreading capabilities and OLE 2.0 compliance. Simply put: If you have a Windows PC, a modem, and crave complete Net access, pick up a copy of InternetWorks today.

Intelligent Install Loading InternetWorks is a breeze. If it encounters files that already exist, it gives you a number of options for dealing with them. And with your consent, it will install Trumpet Winsock, the standard shareware TCP/IP package for Windows. InternetWorks also supports dozens of other TCP/IP stacks.

InternetWorks is compatible with NetCom, PSI, UUNet, and many other nationwide Net service providers. You can also choose a local service provider as long as it offers an SLIP/PPP connection.

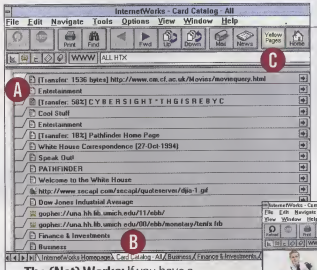
Once you install the software, the first thing you see is the InternetWorks home page, a clickable display leading to a wide range of subject pages. All of these pages are on your hard drive (the whole package takes just over 1MB of disk space), and from them you can click your way onto the Net. If the link is to a Web site, the InternetWorks window displays a Web page. Similarly, if the link is to a Gopher site, you see a Gopher directory.

To send an e-mail message, the File menu has a Send Mail command. For full e-mail services (including attaching files), click on the Mail button in the toolbar. The News button takes you to a browser with capabilities for posting and reading your messages.

Two-Timer The full integration of InternetWorks is great, but there are two other features that make this program unique—and invaluable. First, it supports OLE 2.0, which means you can incorporate it into any OLE-compliant document. Second, InternetWorks is fully multithreaded. Functionally, this means that you can access any feature when a query is underway without affecting the progress of the query. The payoff? You don't have to wait for file downloads to finish before regaining control of your system. (Incidentally, the total number of simultaneous transfers possible depends on the TCP/IP stack. Trumpet allows 32, but it's unlikely that you'll ever need more than 8 or 10.)

The lone feature lacking in the current version of InternetWorks is Telnet, which is no great loss. And while InternetWorks' FTP support is less accessible than it could be, these are minor quibbles—everything else is here, in an integrated, multithreaded, OLE 2.0 bundle.

NEIL RANDALL

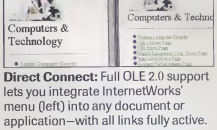


A. InternetWorks' **Card Catalog** displays all cached documents, as well as documents currently being transferred.

B. You'll appreciate InternetWorks' easy-to-use Net interface, especially the familiar **menu tabs** for viewing different suite modules.

C. Looking for that hard-to-find Net site? Look no further than an electronic edition of New Riders' **Official Internet Yellow Pages**—just a click away.

The (Net) Works: If you have a Windows PC, a modem, and a desire to enter the Internet, you can't go wrong with BookLink Technologies' InternetWorks. It's the only complete Windows Internet suite that includes multithreading and OLE 2.0 capabilities, and it works with any online service provider and most TCP/IP stacks.



Direct Connect: Full OLE 2.0 support lets you integrate InternetWorks' menu (left) into any document or application—with all links fully active.

FILEBOX

InternetWorks

Competition: Spry's Internet in a Box, NetCom's NetCruiser, Frontier's SuperHighway Access, and MKS's Internet Anywhere—though none includes multithreading and OLE 2.0 support.

System Requirements: Windows 3.1, 386SX, 4MB of free hard-disk space, 4MB of RAM.

599 est. street price
BookLink Technologies
(800) 453-7873
Reader Service No. 645

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

USABILITY: *Intimidating to install, but works like LANtastic.* ★★★
TECHNOLOGY: *Existing technology repackaged for value and flexibility.* ★★★★
VERDICT: *The fastest, cheapest way to turbocharge LANtastic.* ★★★★

A Shot in the Arm for LANtastic

Even the most die-hard LANtastic fans have known for some time that in order to continue to compete in the networking "big leagues" Artisoft would need to offer a true back-end server solution. But rather than reinvent the wheel, the folks at Artisoft have chosen to hitch a ride on the well-established NetWare bandwagon.

Through a special licensing deal with Novell, Artisoft is bundling its own custom LANtastic-compatible server, NLM, with a copy of NetWare 4.01. The result is CorStream Server, which provides much-needed file and print might for the LANtastic environment. And best of all, it looks and works just like any other LANtastic server—well, sort of.

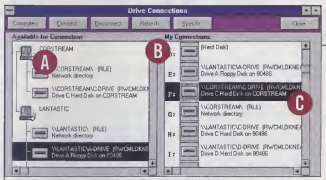
Installation Hurdles Artisoft has done a yeoman's job of insulating its users from the vagaries of a complex network operating system, but the company can go only so far. This is, after all, still NetWare, with the CorStream Server NLM running on top to service LANtastic clients. Suffice it to say that some experience with NetWare 3.x/4.x will go a long way toward smoothing the server setup portion of the CorStream Server installation. Still, we found ourselves dazed, confused, and running for the manual on more than one occasion. If you've never touched NetWare before, seek professional help (in other words, a certified NetWare engineer) when it comes time to install CorStream Server.

However, once the multiphase installation procedure is complete, you'll be delighted to find that using CorStream Server is almost identical to working with any other LANtastic system. You can use the same LANtastic drive and printer redirection tools; you can even chart the server's performance graphically with the Windows-based LANtastic network control panel. Best of all, since the CorStream Server NLM supports the Server Message Block (SMB), you don't have to do a thing to your client workstations. Intimate knowledge of NetWare Core Protocol (NCP) and/or NetWare's Open Data Link Interface (ODI) is fortunately unnecessary.

Familiar Face Although it's based on NetWare, CorStream Server works just like LANtastic. It lets you stick with the familiar LANtastic interface for everything from print redirection to account validation. In fact, the only time you need to delve into the world of NetWare is when you want to alter print queue configurations. But even then the LANtastic documentation takes you through the process step-by-step—from a LANtastic perspective.

Of course, you also reap the many benefits of NetWare 4.01, including on-the-fly data compression; a high-performance, fault-tolerant file system; and enormous processing capacity. And since CorStream Server is a true NetWare server at heart, you can have your traditional NCP-based Novell clients access it just like any other NetWare resource.

CorStream Server is a great solution for LANtastic users who are seeking a seamless way to add file and print power to their existing network setups. While its installation can be intimidating for the inexperienced, once configured CorStream Server adds flexibility and back-end horsepower to your Artisoft network environment. RANDALL C. KENNEDY

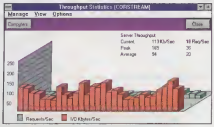


Artisoft to the Core: Artisoft's CorStream Server adds muscle to your NetWare LANtastic environment without adding administrative overhead. To the network, it appears to be just another LANtastic server.

A. Networks connect to CorStream Server like any **LANtastic server.**

B. CorStream Server uses a familiar **split-window tree view,** which makes network management and analysis visually straightforward.

C. You can continue using familiar LANtastic network management utilities to redirect drives and printers. Adding new network drive mappings, for example, is a simple **drag-and-drop operation.**



Bandwidth Boost: LANtastic users will appreciate CorStream Server's data transfer, which they can monitor in real time using the LANtastic network control panel's performance graphs.

FILEBOX

CorStream Server

Competition: Novell's NetWare, Microsoft's Windows NT, and IBM's LAN Server—though only CorStream Server lets you leverage your existing investment in LANtastic.

Minimum System Requirements: 386 or higher, 8MB of RAM.

Test Configuration: 33MHz 80486, 8MB of RAM, ET-4000 video, Artisoft AE-2 Network Interface Cards.

$749 est. street price for five users without client software ($899 with client software)
Artisoft
(800) 233-5564, (602) 670-7100
Reader Service No. 646

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

45 minutes ago you were a *mere mortal*. Now you're drawing flowcharts, organizational charts, even space plans, and someone says, "Geez, I didn't know *You* could do all that." And *You* just take a sip of your coffee.

Using Visio is cake. Just drag the pre-drawn SmartShapes from the stencil to your page. (In technical terms: Drag. Drop. Done.)

Forget the flowing cape and the chrome underwear. You don't need them to be a superhero. All you need is Windows.™ An hour. And Visio.™ It's graphics software that gives you the power to do things you never dreamed of doing. Like drawing a flowchart and putting it into a memo. The big word here is ENABLING. With Visio, you can effortlessly drop graphics into your business documents. No other business graphics program lets you do so much, so fast, with such superhuman efficiency. With 22 stencils and over 750 pre-drawn SmartShapes,™ you can draw all kinds of stuff. (Without actually drawing a darn thing.) Project timelines. Engineering schematics. Block diagrams. You name it. Look, up in the sky. It's a bird. It's a plane. Hey, who is that guy?

Visio is chock-full of over 750 SmartShapes and 22 stencils. So what in the heck does this mean to you? Well pardner, it means you can draw space plans. You can draw block diagrams. You can draw maps. You can draw flowcharts. You can draw project timelines. You can draw till it hurts.

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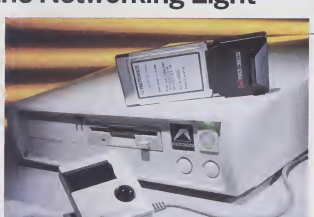
New! NETWORKING: Collaborative

Paradise by the Networking Light

When you think wireless networking, the image that probably comes to mind is one of stubby little antennae sticking out of desktop and notebook computers. These antennae send precious data packets back and forth over excruciatingly slow spread-spectrum radio links.

Photonics, a San Jose–based networking firm, offers an alternative to the spread-spectrum blues: diffuse infrared signaling. The company's Collaborative network adapters give you the mobility you want without the hassles of radio links.

The Collaborative adapters communicate by projecting patterns of infrared light that bounce off objects within the workspace—walls, desks, even people—and are picked up by other Collaborative adapters. Photonics claims that this ricochet action makes the diffuse infrared signal very difficult to obstruct and the resulting "light show" strong enough to fill a 25-by-25-foot workspace.



Cut the Cord: Looking for a wireless networking solution without the hassle? Photonics' Collaborative system uses infrared light to create a wireless networking environment that's more reliable and flexible than spread-spectrum radio links.

To test these claims, we built a small wireless network using notebook PCs, Collaborative's PC Card adapters, and one of its EtherPoint units (to convert the infrared signals into Ethernet packets). Installation was simple, and once the network was established, we tried to block the signal by placing a variety of objects—including a few human bodies—between the systems. Not a hiccup.

Overall, the Collaborative networking system is a winner. More reliable than spread-spectrum radio links and boasting a throughput of 1Mbps, it's a much-needed alternative to traditional wireless technologies. RANDALL C. KENNEDY

USABILITY: *Easy-to-install infrared adapters; device drivers for most networks included.* ★★★★

TECHNOLOGY: *Infrared eliminates many wireless hurdles, a much-needed spread-spectrum alternative.* ★★★★★

VERDICT: *The combination of reliable operation and cutting-edge technology make Collaborative a winner.* ★★★★½

FILEBOX

Collaborative

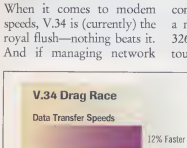
Competition: AT&T's WaveLAN and Selectek's AirLAN, both of which use less reliable spread-spectrum radio links.

$449 est. street price per adapter, $895 for EtherPoint
Photonics
(800) 628-3033, (408) 955-7930
Reader Service No. 647

Motorola 326XFast

High-Stakes Network Modem Game

When it comes to modem speeds, V.34 is (currently) the royal flush—nothing beats it. And if managing network communication applications is a must, a pair of Motorola 326XFast V.34 modems is a tough hand to beat.



Bit Blaster: The Motorola 326XFast V.34 modem beat U.S. Robotics' formidable Courier V.Everything in our modem performance tests.

Designed for large corporate networks, the Motorola 326XFast supports bandwidth-intensive tasks such as remote desktop publishing and inter-router connections. In fact, it proved faster than U.S. Robotics' Courier V.Everything in our performance tests.

The Motorola 326XFast is an impressive and reasonably priced V.34 network modem. Until the next modem protocol comes along, this is your safest bet for network modem needs. RICH SCHWERIN

USABILITY: *LCD screen makes for easy central site control.* ★★★★½

VERDICT: *Nothing better for communication applications on your network.* ★★★★★

FILEBOX

Motorola 326XFast

Competition: Courier V.Everything.

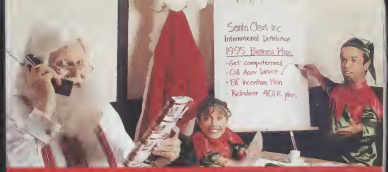
Standards Supported: V.34, V.42, V.42 bis.

$799 est. street price
Motorola ISG
(800) 487-1456
Reader Service No. 648

Guide to the Ratings: ★★★★★ *Excellent* ★★★★ *Good* ★★★ *Acceptable* ★★ *Poor* ★ *Unacceptable*

PHOTOGRAPH BY ARNOLD TREBILCO

Resolve to put Acer systems to work in 1995.



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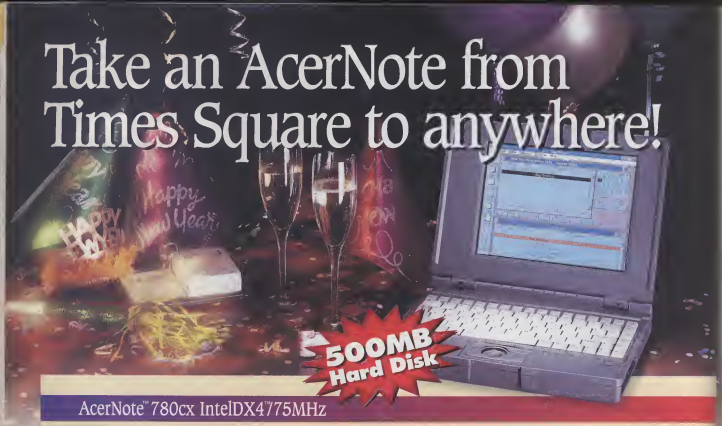

AcerNote™ 780cx IntelDX4®75MHz

Start the year off right and get your projects moving at full tilt with the powerful AcerNote 780cx IntelDX4/75MHz notebook. Its ultra-large hard disk lets you store huge color graphics, voluminous data files, or even entire presentations with no problem. You'll like the battery-saving features, too. Your AcerNote will be running when you need it—and keeping pace with you!

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- 9.5" Active-Matrix LCD Displays 256 Colors
- Easy-to-Remove Keyboard for Quick Memory and BIOS Upgrade
- EasyTrac™ Centrally Located Removable Trackball
- 2 PCMCIA Type II Slots/1 Type III Slot
- 1.44MB Diskette Drive
- Local Bus Accelerated Graphics
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- Easily Upgradable 500MB 2.5" Hard Drive
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- Slim 8.66" x 11.4" x 2.1" Case Weighs 6.4 lbs, Including NiMH Battery Pack
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Easy-to-handle, credit card–sized PCMCIA cards slide into any AcerNote for more memory, network access, or to send documents to a fax machine via modem. PCMCIA cards make the use of additional storage devices easy, and speed the transfer of data between your notebook and desktop computer.

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The AcerNote 760 series offers all the expandability of the 780cx and more power than many current desktop PCs. This notebook packs the Intel 486DX2/50MHz processor into its sleek housing, along with the speed of local bus architecture. So you can take all your major projects on the road with you—not just the lightweights.

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- EasyTrac Centrally Located Removable Trackball
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- 1.44MB Diskette Drive
- Local Bus Accelerated Graphics
- Suspend-to-Disk Feature, "No-Reboot" CMOS Setup and Suspend-Resume Hot Button Preserve Battery Life
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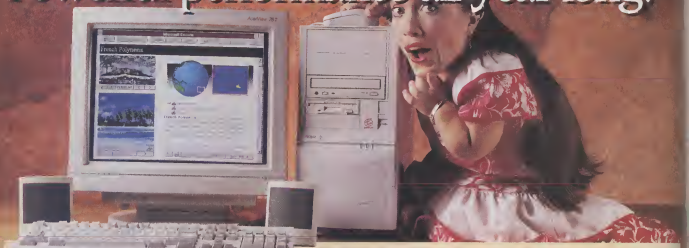

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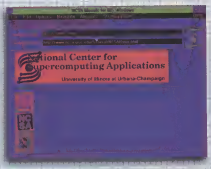
Circle 233 on reader service card.

Logbook LONG-TERM TESTS: Mosaic · QuickTake 100



Internet Browsing: It Keeps Getting Better

Face it, the Internet is just not the same without Mosaic. I can get by using command line searches, but the graphical nature of the World Wide Web really brings the power of the Internet home. Don't get me wrong. I've always loved the Internet—Unix command lines and all. But something was missing. It was powerful, but it wasn't fun. When I know what I want, I ftp or telnet to my destination. When I want to browse, I use Mosaic.

(or page) you get at a site is called a home page. With Mosaic I can browse through the pages that appeal to me, quickly jump to new pages, view images, and play sounds with point-and-click ease.

The bad news is that you have to earn this ease, because the installation is a bear. I quickly learned that because most versions are 32 bit and most of Windows is 16 bit, you have to do some translating. Since Windows doesn't like TCP, you'll also have to add a special dynamic link library (DLL) called Winsock. But after this one-time ordeal, you'll never go back to the archaic Unix command lines.

I download files from the Net all the time, so I'm particularly interested in speed. A newer program called Netscape, developed by the same visionary who dreamed up Mosaic, offers the same functionality and easy-to-use interface, plus lightning-fast performance improvements. Even better, this program is also free, which means that as good as Mosaic is, Netscape is looking even better. But that's another story. **JOHN TASCHEK**

Logbook Entries:

August 8, 1994: *My version of Mosaic didn't have a PostScript (.ps) viewer, so I add one myself. I can't read those pesky PostScript files online without printing them. As a workaround, I add two lines:* `Type1="application postscript"` *and directly below that line,* `application postscript= c:\graphics\gs\gs.exe %ls`

September 12, 1994: *I dump Windows 3.1 for Windows NT 3.5. Mosaic works like a charm, without any dynamic link libraries.*

October 19, 1994: *Graphics take too long to download! I have to wait until the entire graphic shows before I can back out of the page.*

December 22, 1994: *I can avoid Mosaic's speed drawbacks but keep the interface and functionality*

PC Computing

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Here's a small piece of big news for everyone who computes away from the office.

Pereos, the maximum mobile storage device, has arrived.

Now, if that doesn't make your eyes bug out, then you haven't arrived at home, at a hotel, or at 30,000 feet, only to discover the data you need is back on the server.

With Pereos, having all the right stuff right now is never a problem. Because now you can take it all with you – files, software, and all the server data you could possibly want.

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Pereos weighs less than ten ounces, attaches to any parallel port on any PC, runs for months on a pair of standard AA batteries and stores the equivalent of 868 floppies on a cartridge the size of a postage stamp.

It also comes complete with powerful data management software that locates and synchronizes your files and makes backup a breeze.

Call 800-328-2779 *We'll explain how our high speed data transfer makes Pereos the handy way to move files from desktop to desktop – no network required.*

DATASONIX

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Logbook LONG-TERM TESTS: Mosaic · QuickTake 100

Internet Browsing: It Keeps Getting Better

Face it, the Internet is just not the same without Mosaic. I can get by using command line searches, but the graphical nature of the World Wide Web really brings the power of the Internet home. Don't get me wrong. I've always loved the Internet—Unix command lines and all. But something was missing. It was powerful, but it wasn't fun. When I know what I want, I ftp or telnet to my destination. When I want to browse, I use Mosaic.

Mosaic offers access to thousands of Web sites, each offering hypertext links. It's so friendly that even the first screen (or page) you get at a site is called a home page. With Mosaic I can browse through the pages that appeal to me, quickly jump to new pages, view images, and play sounds with point-and-click ease.

The bad news is that you have to earn this ease, because the installation is a bear. I quickly learned that because most versions are 32 bit and most of Windows is 16 bit, you have to do some translating. Since Windows doesn't like TCP, you'll also have to add a special dynamic link library (DLL) called Winsock. But after this one-time ordeal, you'll never go back to the archaic Unix command lines.

I download files from the Net all the time, so I'm particularly interested in speed. A newer program called Netscape, developed by the same visionary who dreamed up Mosaic, offers the same functionality and easy-to-use interface, plus lightning-fast performance improvements. Even better, this program is also free, which means that as good as Mosaic is, Netscape is looking even better. But that's another story. JOHN TASCHEK

Mosaic / NCSA / (212) 244-3473 / Free; a version is available as MOSAIC.ZIP from PC Contact's data library 3 (Utilities/Misc.). See page 330 for details.

Logbook Entries:

August 8, 1994: *My version of Mosaic didn't have a PostScript (.ps) viewer, so I add one myself. I can't read those pesky PostScript files online without printing them. As a workaround, I add two lines:* Type1="application postscript" *and directly below that line,* application postscript= c:\graphics\gs\gs.exe %ls

September 12, 1994: *I dump Windows 3.1 for Windows NT 3.5. Mosaic works like a charm, without any dynamic link libraries.*

October 19, 1994: *Graphics take too long to download! I have to wait until the entire graphic shows before I can back out of the page.*

December 22, 1994: *I can avoid Mosaic's speed drawbacks but keep the interface and functionality by opting for Netscape. I'm thinking of switching.*

Logbook Entries:

August 15, 1994: *Talk about usability! I'm snapping pictures and "developing" them onto my hard drive in seconds.*

August 17, 1994: *Yikes! A single high-resolution image needs 1MB of disk space. That can add up. I'm realizing that I'll need loads of floppies or another hard disk.*

November 24, 1994: *I need a quick photo for a newsletter. I break out the QuickTake 100, and within minutes the digital image is placed in the layout.*

January 11, 1994: *Image quality is excellent—but photos look best when they're printed small.*

You Can Take It with You

No film? Really? As soon as I heard about Apple's QuickTake 100 digital camera, I began imagining the possibilities. I could snap photos, develop the images by downloading them to my PC, and e-mail them across the country—in seconds. No film costs, no waiting for developing. And since the images are digital, I could easily drop them into documents of all kinds.

Five months later, the QuickTake 100 lives up to its promise. The images aren't quite film quality, but they're better than what you get with a video capture board.

On the downside, the QuickTake 100 holds just eight high-resolution color images (or 32 low-resolution images), so you need a PC or portable to empty the images from the camera's memory. Stashing the QuickTake 100's images outside the camera is also a problem: A single high-resolution image occupies 1MB of space.

If you need images instantly, the QuickTake 100 is quick and cost-effective. If time isn't critical, however, use a standard 35mm camera and have the film developed onto a PhotoCD (many photo shops now offer this service). At $1.75 an image, PhotoCDs are cheap and offer a handy way to archive old images. WENDY TAYLOR

QuickTake 100 / Apple Computer / (800) 538-9696 / $699 est. street price / *Reader Service No. 661*

PHOTOGRAPH BY FRED STIMSON

PHIL JACKSON
HAS BEEN WARPED
SINCE THE START
OF THE SEASON.

Before any basketball coach tries to emulate the winning ways of Coach Phil Jackson, they may want to take a peek inside his computer.

If they did, they'd see that Phil can do some pretty neat things. Like use his computer to review video of last night's game against New York. At the exact same time that he's e-mailing a respectful appeal to the League. Of course, being a game day, he's also, at the same time, using a Windows™ graphics program to jot down plays.

They might also note that Phil never has to worry about totally losing it (his programs, that is) if an application ever goes down. And that Phil can get on the Internet and other on-line services incredibly fast and easy, so he can get up-to-the-minute stats and injury reports.

In short, they'd see that Phil has OS/2 Warp, a new multitasking operating system that gives DOS and Windows* programs amazing versatility. (And anyone who's ever seen Phil coach, knows he likes versatility.)

THE WORD "TECHNICAL" DOESN'T FAZE HIM.

Now, just so there's no confusion, Phil's not letting anyone take a peek inside his computer.

OS/2 Warp is available for under $90. (Or for just slightly more than the cost of a court-side seat.) To get warped, stop by your local software dealer, or call 1 800 3 IBM-OS2. Ask for a free demo disk.

The new 32-bit, multitasking, multimedia, Internet-accessed, crash-protected, Windows-friendly, totally cool way to run your computer. **OS/2® WARP**

IBM

OS/2 Warp is available from your software dealer. It is also available from IBM for $89 by calling 1 800 3 IBM-OS2.
Reseller prices may vary. OS/2 Warp consists of OS/2 Version 3 and BonusPak. IBM, Operating System/2 and OS/2 are registered trademarks of the International Business Machines Corporation. The OS/2 logo is a trademark of IBM. Windows is a trademark of Microsoft Corporation. *On systems with Windows installed.
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The Ultimate Bargain

SYNOPSIS

LOW-COST DESKTOPS: *Be amazed at the power and features you can get for $3,500.* **138**

PERFORMANCE DESKTOPS: *You'll get a bit more system for $4,500—but not as much as $1,000 might imply.* **146**

LOW-COST NOTEBOOKS: *For less than $2,000 you'll get luggable quality—with sound and color, even.* **154**

PERFORMANCE NOTEBOOKS: *Notebooks get lighter and faster when you up the ante to $4,000, but they still won't replace a desktop.* **158**

REALITY BYTES: *Getting the ultimate PC once took patience. Now it just takes a check.* **164**

Pop quiz. The best way to buy a computer is: *(a)* by storming into a computer dealer and shouting, "I'm *not* going to pay a lot for this PC!"; *(b)* through a brother-in-law who says he can get it for you *almost wholesale; (c)* from a guy named Al who's selling them out of the back of his van; *(d)* by using an RFP.

If you answered a, b, or c, give me a ring: I've got an Atari 400 you're gonna love. If you answered d, either you already have at least an inkling of what an RFP is, or you're smart enough to know that anything's got to be better than the first three.

RFP stands for request for proposal. It's a systematic way to make sure you get the most computer for the fewest bucks. With an RFP, you define the PC system you want and get prospective sellers (retail or direct) to bid for your business. An RFP also has side benefits of giving you a feel for the type of service you can expect from a seller, and making sure you know what kind of PC hardware you really need.

An RFP is simply a detailed list of the minimum components you want a computer to have, and the maximum price you're willing to pay. We compiled a list based on a survey of *PC Computing* readers who told us the features they needed most in desktop and portable computers. Then we created four RFPs: two each for desktop machines and color notebooks. For each class, one RFP was designed for low-cost systems, the other allowed a higher purchase price, but also demanded more powerful performance.

We faxed the RFPs to a wide range of manufacturers. From the responses we received, we chose three systems in each category—low-cost desktop systems, high-end Pentium desktops, low-cost color notebooks, and high-end color notebooks—based on bang for the buck. ZD Labs and *PC Computing*'s own testing labs gave each system a thorough workout to determine whether any of the manufacturers were offering low prices by skimping on components or assembly.

The results surprised us, and they'll surprise you—pleasantly.

BY RON WHITE

A DREAM BOX: You'll think you're dreaming: $3,300 can't buy this much computer. But it does when you're talking to Polywell.

B GOOD STUFF: You get some nicer gewgaws in the $2,990 Pantera 90 from Zeos—a high-performance contender.

C GLASS HEART: A disk drive with low-error glass platters is a main attraction of AT&T's $3,484 Globalyst 200.

D SPEAK TO ME: MidWest Micro's $1,999 entry in the low-cost notebook category has something that you won't generally find in an inexpensive notebook: Sound.

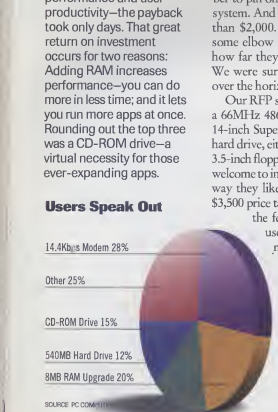
PHOTOGRAPHS BY STAN MUSILEK

Run the Gamut: Solutions for your needs at price points that make sense.

Get the Most Computer For the Least Money

Faster Modems: Our readers chose a 14.4Kbps modem as the top pick for an addition to a low-cost desktop system. (That choice may have been influenced by the fact that many of the readers were polled online via ZiffNet.) Most of the systems offer a 14.4Kbps modem as an option. After the modem came more RAM. In our "Upgrades that Pay" feature (November 1994, page 196), we performed a cost/benefit analysis and found that adding RAM to a system was one of the best ways to improve performance and user productivity—the payback took only days. That great return on investment occurs for two reasons: Adding RAM increases performance—you can do more in less time; and it lets you run more apps at once. Rounding out the top three was a CD-ROM drive—a virtual necessity for those ever-expanding apps.

Users Speak Out



Think about buying a car. Different people buy cars for different reasons. Some buy on brand-name cachet. Some buy on performance or economy or safety. But even if what you want in a car seems very clear when you start, by the time the salesperson is through with you, you're not even sure of your name. Which is probably good, otherwise you might be tempted to sign it to a ridiculously large check.

Now think about buying a car using a request for proposal (RFP). You tell the dealerships your minimum criteria for buying a car and a maximum price you're willing to pay. Then the dealerships must come up with automobiles that satisfy your needs. It would be heaven. Except for figuring out the requirements to put into the RFP.

When we were creating an RFP for a low-cost desktop PC, we discovered that one person's low-cost, entry-level PC is another's behemoth. Some of us argued that $3,500 was a high number to pin on what's supposed to be a low-cost system. And it's true, you can find PCs for less than $2,000. But we wanted to give vendors some elbow room to add options and see just how far they could stretch a computer dollar. We were surprised when that dollar stretched over the horizon and into the next state.

Our RFP stated that a PC should have at least a 66MHz 486DX2 processor, 8MB of RAM, a 14-inch Super VGA monitor, at least a 340MB hard drive, either a PCI or VESA local bus, and a 3.5-inch floppy drive. The computer makers were welcome to improve on that configuration in any way they liked, as long as they didn't exceed a $3,500 price tag. We gave them a few hints about the features our reader survey revealed users would like, such as a 14.4Kbps modem and a CD-ROM drive. As it turned out, several systems came equipped with CD-ROM drives, and most already had hard drives bigger than our required 340MB.

The first thing we found was that a 486 was far too modest a demand. As this story was being researched last fall, several manufacturers told us all varieties of the 486 would be cold silicon by the first of the year. They all forecast that Intel would lower the price of Pentium chips so much that the extra cost should be negligible, and anyone selling 486 PCs in 1995 would be simply trying to get rid of excess inventory.

That doesn't mean we didn't receive some bids for 486 machines, but there were so many bids for Pentium PCs that the 486 systems never stood a chance. Others that didn't stand a chance were bids submitted by company representatives who must have a hard time signing their names. Important information in our faxed forms was left blank, making it impossible to figure out exactly what types of machines were being offered or for how much. Consider that a bad sign in your own RFP shopping. If a manufacturer doesn't put effort into making a sale, you should wonder how much effort they would put into correcting a shipping or technical mistake. Plus, you'll find (as we did) that you will get plenty of offers from companies whose representatives *do* know how to answer simple questions—so many that you can toss incomplete forms without a second thought.

Once we received the vendors' proposals, we compared features against cost, and figured in the reputations of the companies' service and support. We narrowed the contenders to three systems, which we ran through our gauntlet of benchmarks, usability testing, and assorted poking and prodding. A tiny Pentium PC from Polywell not only led the other two machines we tested—Pentium systems from Zeos International and Gateway 2000—but it would have been a strong contender among our high-end contestants, lacking only, compared to them, a bigger case for future expansion. (See "More Cash Nets Better Doodads," page 146.) Polywell's Poly 590P3 is the most expensive of the three systems, but it comes already stocked with most of the extras that are additional-cost items on the other two PCs. Even being the most expensive of the three, the Poly 590P3 is the Pentium bargain of the year.

The Bottom Line Don't underestimate what you can get for your money and a bit of detailed research. PCs haven't become such commodities that there are no significant performance and price differences among them. With the right homework, there *are* bigger bangs to be had for fewer bucks.

Constructing a Low-Cost Desktop System

What It Costs to Add the Most Requested Options

	Config.	14.4Kbps Modem	16MB of RAM	CD-ROM Drive	17-inch Monitor	Larger Hard Drive	High-End Graphics Card	Faster CPU	Sound Card	Speakers	Price with Options
Poly 590P3 Polywell (415) 583-7222 $3,300* *Reader Service No. 681*	CPU: 90MHz Pentium RAM: 16MB Disk: 540MB	Included	Included	Included	Included	$275	$250	N/A	Included	Included	$3,825
Pantera Pentium 66 Zeos Int'l. (800) 554-5218 $2,745* *Reader Service No. 682*	CPU: 66MHz Pentium RAM: 16MB Disk: 720MB	$99	Included	Included	$345	$95	Included	$150	$99	$179	$3,712
P5-60 Gateway 2000 (800) 846-2062 $2,199* *Reader Service No. 683*	CPU: 60MHz Pentium RAM: 8MB Disk: 730MB	$99	$300	Included	$260	$120	Included	N/A	$159	Included with sound card	$3,137
Bravo MS P/90 AST (800) 876-4278 $2,519* *Reader Service No. 684*	CPU: 90MHz Pentium RAM: 8MB Disk: 540MB	N/A	$318	$213 by itself, or bundled with sound card	$805	N/A	N/A	N/A	$381 includes CD-ROM drive	Included with sound card	$4,023
Celebris 466 DEC (800) 396-2217 $2,248* *Reader Service No. 685*	CPU: 66MHz 486DX2 RAM: 8MB Disk: 270MB	$135	$449	$149	$999	N/A	N/A	N/A	$119	$75	$4,174
Endeavor VL Epson (800) 374-7300 $1,668* *Reader Service No. 686*	CPU: 66MHz 486DX2 RAM: 8MB Disk: 420MB	$89	$360	$125	$799	$50	$269	N/A	$85	Included with sound card	$3,445
Express VL 4/66d ALR (800) 444-4257 $1,384* *Reader Service No. 687*	CPU: 66MHz 486DX2 RAM: 8MB Disk: 420MB	$129	$362	Included	$799	$345	Included	N/A	$229 includes CD-ROM drive	Included with sound card	$3,248
Feat-39D DTK (818) 810-0098 $1,390* *Reader Service No. 688*	CPU: 66MHz 486DX2 RAM: 8MB Disk: 365MB	$92	$385	Included	$745	$125	$255	$1,780	$295 includes CD-ROM drive	Included with sound card	$5,067
Globalyst 580 AT&T (800) 509-9606 $2,830* *Reader Service No. 689*	CPU: 60MHz Pentium RAM: 16MB Disk: 520MB	$395	Included	$205	$1,035	N/A	N/A	N/A	N/A	N/A	$4,465
P90PCI PowerStation Micron (800) 347-3490 $2,299* *Reader Service No. 690*	CPU: 90MHz Pentium RAM: 8MB Disk: 527MB	$99	$320	Included	$300	$150	Included	$599	$229	Included with sound card	$3,996

*NOTE: PRICES UPDATED AS OF PRESS TIME.

POLYWELL POLY 590P3

High Speed, Many Features

DOS Performance

NOTE: PCBENCH 6.0 MEASURES SYSTEM COMPONENT PERFORMANCE IN DOS.

PC Best

You figure there just has to be a catch somewhere. A PC that has such kick-butt performance as Polywell's Poly 590P3 and includes a CD-ROM drive, 14.4Kbps modem, sound card, and extra memory—yet falls below our maximum price of $3,500. Well, that's just too good to be true, right? Wrong.

The component that immediately distinguishes the Poly 590P3 is its 90MHz Pentium. Another significant performance boost is a PCI/IDE drive controller with 2MB of cache.

OK, there *are* two catches. The speakers provided with this system are toys. And the Poly 590P3 is housed in a minitower case, leaving less expansion room. But with a computer as well-stocked as this one, you'd be hard-pressed to think of anything you'd need to add.

TECHNOLOGY: *Systems lacks an Enhanced IDE disk drive.* ★★★★

VERDICT: *An unbeatable combination of price and performance.* ★★★★

FILEBOX

As Tested: 90MHz Pentium, 16MB of RAM, 540MB hard drive, CD-ROM drive, PCI local bus, sound card and speakers, 14.4Kbps internal modem.

$3,300
Polywell Computers
(415) 583-7222
Reader Service No. 681

ZEOS PANTERA PENTIUM 66

Great System, Great Price

Disk Performance

NOTE: WINBENCH 95 MEASURES GRAPHICS AND DISK PERFORMANCE IN WINDOWS 3.1

If it weren't for Polywell's Poly 590P3, the Pantera Pentium 66 from Zeos would have done a cakewalk. With its 66MHz Pentium processor, the Pantera 66 bested the Poly 590P3 occasionally, but came in second most of the time.

And although the $2,745 price for its base configuration is notably lower than the Poly 590P3's $3,300—the Pantera 66 doesn't include a modem, sound card, or speakers as standard items. And by the time you in add all the extras (which come standard on the Poly 590P3), including a faster Pentium chip, the Pantera 66 tops out at $3,712.

In all, the Pantera 66 is an excellent machine, and its optional combination of sound card and Altec Lansing speakers make it a great multimedia PC. But like all others in its category, it can't touch the price and performance of the Poly 590P3.

TECHNOLOGY: *A well-engineered motherboard.* ★★★★

VERDICT: *A good, solid desktop with room for expansion.* ★★★★

FILEBOX

As Tested: 66MHz Pentium, 16MB of RAM, 720MB hard drive, CD-ROM drive, PCI local bus, 15-inch monitor, high-performance graphics card.

$2,745
Zeos Int'l.
(800) 554-5218
(612) 362-1234
Reader Service No. 682

GATEWAY 2000 P5-60

Coulda Been a Contender

Graphics Performance

NOTE: WINBENCH 95 MEASURES GRAPHICS AND DISK PERFORMANCE IN WINDOWS 3.1

We have some good news and some bad news. The good news is Gateway 2000's P5-60 is a perfectly good PC. The bad news is Gateway omitted an important feature: a 32-bit driver for its Enhanced IDE controller.

The dawdling performance of 16-bit disk access pulls down the overall speed of Gateway's P5-60. Scoring less than 25 percent of the Poly 590P3's performance, the P5-60 ranked at the bottom of nearly all of our tests. The new driver is available from Gateway's bulletin board.

Gateway's P5-60 comes without a sound card, although it provides a CD-ROM drive as standard equipment. A newer model, the P5-75, with better performance and more features than the P5-60, is scheduled for first-quarter release this year.

TECHNOLOGY: *The lack of a 32-bit Enhanced IDE driver is shortsighted.* ★★

VERDICT: *Price is really low, but you'll need to get new drivers.* ★★

FILEBOX

As Tested: 60MHz Pentium, 8MB of RAM, 730MB hard drive, CD-ROM drive, PCI local bus, 15-inch monitor, high-performance graphics card.

$2,199
Gateway 2000
(800) 846-2062
(605) 232-2000
Reader Service No. 683

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(ōō´bē)

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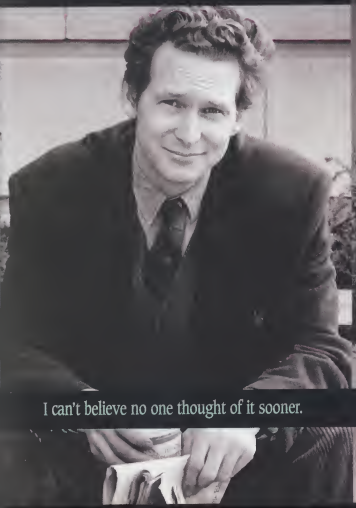
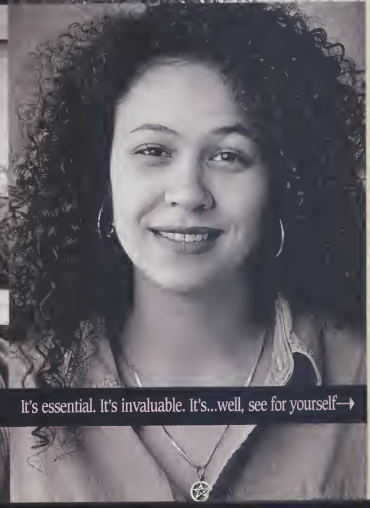
It's going to change how people use computers.



I can't believe no one thought of it sooner.



It's essential. It's invaluable. It's...well, see for yourself→

OOBE can be found only in Acer computers, including our full line of multimedia PCs, available at selected retailers across the United States. So even first-time PC users can get a fast and easy introduction to this exciting new world of computer sights and sounds. Each Acer multimedia system combines a powerful computer (from desktop systems to Pentium™-processor minitowers) with these valuable audio, visual and communications features:

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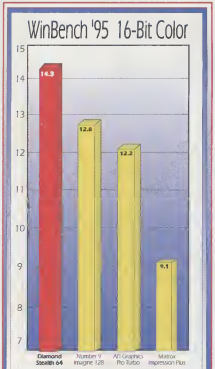
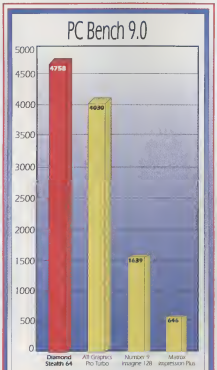
NO CONTEST.

"The Diamond Stealth 64 VRAM is the leader in performance and usability. It blazed through our tests, recording the best times... Its InControl Tools lets you master your environment in every respect; icons make it simple to control power management, establish multiple views, and zoom in on targeted information." —John Gartner, Technical Editor, Serdar Yegulalp, Assistant Technical Editor, James Miller, Laboratory Assistant, "Windows Magazine Recommended", *Windows Magazine*, December 1994





Windows 3.1 PCI performance tests performed by Diamond Multimedia Systems, Inc. on publicly available hardware and software running 2/11-Gates' WinBench95 95 Version 1.0 on an HP Vectra XU 5/90 Pentium 90MHz system with 256k cache, 40MB RAM, 540MB SCSI hard disk, SmartDrive 20MB 128, and DOS 6.2. All Cards were tested at 1024x768x65k 72Hz Large font. The Stealth 64 VRAM was configured with 2MB of VRAM using driver release 1.20. The ATI Graphics Pro Turbo was configured with 2MB VRAM using driver release v1.03. The #9 Imagine 128 card was configured with 4MB VRAM using driver release v1.29. The Matrox Impression Plus was configured with 2MB VRAM using driver release 1.42.

Here's how Diamond's Stealth™ 64 did it.

- **The fastest accelerator available:** Two versions, the ultra fast VRAM for high resolution 24-bit color illustrations and the advanced DRAM version, for virtually every DOS & Windows user.
- **Powerful:** Combines streamlined graphics with high performance 64-bit processing power.
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- **Colorful.** True color performance in high resolution for sharp, clear text and graphics, turning out up to 1152 x 864.
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- **Unlimited support:** Get help via phone, fax, CompuServe or America Online support systems.
- **Award winning software:** Includes CorelDraw 3.0 CD, HIGH-RES Flight Simulator* and Diamond Multimedia's InControl Tools™.
- **Easily installed:** Simple and straightforward, saving time and effort by automatically organizing files during set-up.
- **Five year warranty.**

*Included with Stealth 64 VRAM Version Only.

December, 1994 — November, 1994 — September, 1994

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FAX-Back 800-380-0030.

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(Formerly Diamond Computer Systems, Inc.)

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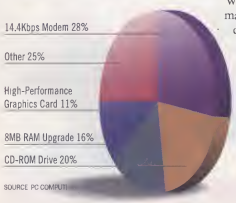
More Cash Begets Better Doodads

Sound Loss: As with low-cost PCs, the demand for a 14.4Kbps modem leads the pack. Next come CD-ROM drives followed by RAM upgrades. Both make sense: Users need to get data into their computers and manipulate it faster.

The percentages taper sharply, leaving only 5 percent of those surveyed asking for CPU upgrades—low considering the quick (and cost-effective) productivity boost they can create. There are upgrades available (like Cyrix's Cx486SRx2), which can make a 386-based computer perform like a 486 for only about $300.

A sound card comes in last. To us, this seems odd—without a sound card, a CD-ROM drive loses many of the perks of multimedia. What we're probably seeing is a reaction to how business-oriented multimedia titles haven't yet proven themselves to be useful.

Users Speak Out



SOURCE: PC COMPUTING

An RFP can do more than make sure you pay the least buck for the bang; it also makes sure you get the most bang for the buck. If performance is more important than price, an RFP will ensure that you get a computer that provides the most power and speed, which generally translate into productivity.

We searched for high-end PCs by sending out an RFP that specified a 90MHz Pentium processor, at least a 540MB hard drive, 16MB of RAM, a 17-inch monitor, a PCI or VESA local bus, and a CD-ROM drive—truly a computer to kill for. But to avoid nasty homicide trials, we asked simply that it cost no more than $4,500, which is $1,000 more than the price limit on our low-cost desktop system RFP. (See "Get the Most Computer for the Least Money," page 138.)

We also asked for alternative configurations with 24MB of RAM, a 14.4Kbps modem, a larger hard drive and monitor, a sound card, and a high-performance video adapter. Several of the high-performance systems already came with these as standard components.

With and without the extras, quite a few systems just made it in under the price limit—and a few setups blew the cost barrier completely. We narrowed the field to three contenders for testing, based more on features and expected performance than on price. One of the finalists could almost have made it into our low-cost category when we received the original RFP bid—the Pantera 90 from Zeos International. With press-time price drops, it could have won the low-cost category. The third contender, Gateway 2000's P5-90XL, nearly did the same.

What surprised us most in all the machines was that there was so little difference between the high-end systems and the PCs we received in the low-end category. The moral to be learned here is that the cost of materials and the cost of assembling components doesn't vary that much no matter what kind of PC it is. Sure, it was expensive for Intel to develop the Pentium, but discount R&D, and you have just another assembly line job that's not that much different from stamping out and plugging in a 486 processor—just more sophisticated.

There are more similarities than differences in the basic high-end systems. All were tower models, all have 90MHz Pentium processors—the fastest Intel processor shipping in quantity right now—and all come with CD-ROM drives; sound cards; 1GB drives; and high-performance, Windows accelerator video adapters. All come with DOS and Windows for Workgroups. Insight's machine comes with the add-on most requested by our readers—a 14.4Kbps modem. All in all, each of the systems is one you could take out of the box, plug in, and start to use with not only a feeling of confidence, but with the sense of pure power mere mortals usually get only behind the joystick of a fighter jet.

But that doesn't mean all the machines are equal. When we ran them through the ZD Labs benchmark tests that give the machines a taste of the real world in terms of running the applications in a typical office, small things—such as RAM caches and drivers—made the difference in performance. We also favored the PCs with the most room for expansion. (Although the machines already come with just about all the high-tech gewgaws you can imagine, we know from past experience that what seems like the ultimate PC today can start to look technologically deprived next year.)

Of the three systems, the winner in price and performance was the Pantera 90. In both its standard and hyped-up configurations, Zeos's Pantera 90 is much cheaper than the other two in its category. Even the version with all the extras we requested comes in under the maximum price. In fact, at press time the Zeos machine's price dropped below that of the 90MHz Poly 590P3 Pentium from Polywell that we tested in the low-cost category. (When we issued the RFP, however, Zeos's Pantera 90 was about $1,000 more expensive—a sign of just how much prices are dropping.)

The Bottom Line Don't make any assumptions about the relationship among price, performance, and brand names. The three machines we tested are each from respected manufacturers, and benchmark results show that higher price tags don't automatically mean better performance.

Constructing a High-Performance Desktop System

What It Costs to Add the Most Requested Options

	Configuration	14.4Kbps Modem	24MB of RAM	High-End Graphics Card	1GB Hard Drive	20-inch Monitor	Sound Card	Price with Options
Pantera 90 Zeos Int'l. (800) 554-5218 $2,990* *Reader Service No. 691*	CPU: 90MHz Pentium RAM: 16MB Disk: 1GB	$89	$392	Included	Included	N/A	$99	$3,580
PCI P90 MM Ultimate Insight Direct (800) 755-3875 $4,449* *Reader Service No. 692*	CPU: 90MHz Pentium RAM: 16MB Disk: 1GB	Included	$390	Included	Included	$930 21-inch	Included	$5,769
P5-90XL Gateway 2000 (800) 846-2062 $3,674* *Reader Service No. 693*	CPU: 90MHz Pentium RAM: 16MB Disk: 1GB	$99	$300	Included	Included	$995	Included	$5,068
Celebris 590 DEC (800) 396-2217 $3,248* *Reader Service No. 694*	CPU: 90MHz Pentium RAM: 16MB Disk: 540MB	$135	$449	N/A	N/A	$1,999 21-inch	$119	$5,950
Evolution X/90 ALR (800) 444-4257 $4,206* *Reader Service No. 695*	CPU: 90MHz Pentium RAM: 16MB Disk: 1GB	$129	$362	$379	N/A	N/A	Included	$5,076
OptiPlex XM/590 Dell (800) 613-3355 $4,148* *Reader Service No. 696*	CPU: 90MHz Pentium RAM: 16MB Disk: 540MB	$89	$650	N/A	$210	N/A	$279 includes CD-ROM drive	$5,386
P90PCI PowerStation Micron (800) 347-3490 $3,899* *Reader Service No. 697*	CPU: 90MHz Pentium RAM: 32MB Disk: 1GB	$99	Included	Included	Included	$1,400 21-inch	$199 MPC Home Upgrade Kit	$5,597
Poly 590P5 Polywell (415) 583-7222 $4,545* *Reader Service No. 698*	CPU: 90MHz Pentium RAM: 32MB Disk: 1GB	$75	Included	Included	Included	$300	Included	$4,920
Premmia GX P/90 AST (800) 876-4278 $4,380* *Reader Service No. 699*	CPU: 90MHz Pentium RAM: 16MB Disk: 730MB	N/A	$380	Included	N/A	$2,039	Included	$6,799
Quin-51D DTK (818) 810-0098 $2,300* *Reader Service No. 700*	CPU: 90MHz Pentium RAM: 16MB Disk: 540MB	Included	$385	$255	$300	N/A	$295 includes CD-ROM drive	$3,535

*NOTE: PRICES UPDATED AS OF PRESS TIME

ZEOS PANTERA 90

Pedal to the Metal

App Performance

NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

PC's Best

If you want all-out horsepower with room to grow, the Pantera 90 from Zeos is ideal. It tied with Polywell's 90MHz Pentium Poly 590P3 in our overall benchmarks, and took the lead in some individual tests.

Measurably the best in its category, the Pantera 90 has some more subjective benefits to boot. Our judges ranked its 17-inch monitor best overall in image quality, and gave a good mark to its optional Altec Lansing speakers.

There was one other measurable way in which the Pantera 90 beat the Poly 590P3. The Pantera 90 is housed in a full-height tower. With seven drive bays still available after the CD-ROM drive, hard drive, and floppy drive are accounted for, it has the most room to grow of any of the systems. The standard hard drive is 1GB.

TECHNOLOGY: *No single component is leading edge.* ****

VERDICT: *Great performance and expansion.* *****

FILEBOX

As Tested: 90MHz Pentium, 16MB of RAM, 1GB hard drive, dual-speed CD-ROM drive, PCI local bus, 17-inch monitor, high-performance graphics card.

$2,990
Zeos Int'l.
(800) 554-5218
(612) 362-1234
Reader Service No. 691

INSIGHT PCI P90 MM ULTIMATE

A Sound Step Above

Graphics Performance

NOTE: WINBENCH 96 MEASURES GRAPHICS AND DISK PERFORMANCE IN WINDOWS 3.1

Actually, there's not much wrong with Insight's PCI P90 MM Ultimate that more speed couldn't cure. In our application-based testing, which reflects real-world PC usage, it was almost always the lowest-ranking 90MHz Pentium.

If you're not a speed hog—yeah, sure—then you may like the fact that the PCI P90 MM was judged best in our subjective ranking of sound systems. And it was the only PC we tested that came with a quad-speed CD-ROM drive instead of a dual-speed drive—although it was also the only CD drive that required an annoying disc caddy.

The case is a full-height tower, and there's plenty of room for expansion. But when you open it up, don't be surprised by dabs of white glue wherever a cable meets its connector. Don't worry though, the glue lets go when you need it to.

TECHNOLOGY: *Good graphics performance but sickly performance overall.* ***

VERDICT *Too much to pay for too little.* ***

FILEBOX

As Tested: 90MHz Pentium, 16MB of RAM, 1GB hard drive, quad-speed CD-ROM drive, 14.4Kbps modem, PCI local bus, 17-inch monitor, high-performance graphics card, sound card.

$4,449
Insight Direct
(800) 755-3875
Reader Service No. 692

GATEWAY P5-90XL

Marred by Poor Performance

Disk Performance

NOTE: WINBENCH 96 MEASURES GRAPHICS AND DISK PERFORMANCE IN WINDOWS 3.1

As with its P5-60, Gateway 2000 doesn't ship the Enhanced IDE 32-bit disk driver with this system—a 90MHz Pentium called the P5-90XL. And as in the case of the P5-60 60MHz Pentium, the driver is available via Gateway's bulletin board. But why should anyone have to go to that trouble?

The individually good components in the P5-90XL aren't tuned for high performance. It's like driving a Porsche with a governor on the throttle. Although the P5-90XL performed well in graphics juggling, it was mediocre in other tests. The system locked up repeatedly during a Photoshop benchmark.

The P5-90XL's Altec Lansing ACS-31 speakers were rated poorest among the high-performance PCs by our test panel. Our judges also gave the P5-90XL the lowest rating for monitor quality.

TECHNOLOGY: *Good components that don't perform as well as they should.* **

VERDICT: *Too many things aren't right.* **

FILEBOX

As Tested: 90MHz Pentium, 16MB of RAM, 1GB hard drive, dual-speed CD-ROM drive, PCI local bus, 17-inch monitor, sound card.

$3,674
Gateway 2000
(800) 846-2062
(605) 232-2000
Reader Service No. 693

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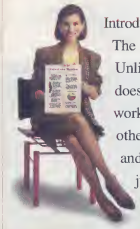
Makes Microsoft Off



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NEW PERFECTOFFICE FOR WINDOWS

The network suite vs. the stand-alone suite.

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Complete integration vs. partial integration.

The programs in PerfectOffice have a consistent interface. So do the programs in Microsoft Office. But PerfectOffice uses more common code and components, reducing system requirements. Plus, it supports Windows technologies like OLE 2.0 in more programs than Microsoft Office. Ironic, isn't it?

Automatic software vs. manual software.

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PerfectOffice is so automatic, it even corrects spelling errors as you type. We know, so does Microsoft

	PerfectOffice 3.0 Standard Edition	Microsoft Office 4.2 Standard Edition
Programs have consistent interfaces	YES	YES
Integrated E-mail, calendaring and scheduling**	YES	NO
Workgroup publishing features	YES	NO
Number of applications with OLE 2.0 support	Four	Three
Number of applications with on-the-fly spell checking	Three	One
Automated tasks that work independent of applications	YES	NO
Grammar checker can rewrite entire sentences	YES	NO
Intelligent find and replace	YES	NO
Ability to record scripts (macros) across applications	YES	NO
Supports both Visual Basic & AppWare programming tools	YES	NO
Six months of free, toll-free technical support*	YES	NO

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The innovative program that helps you create more effective presentations

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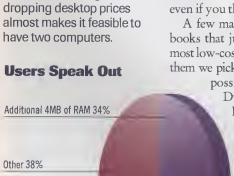
Cash and Carry—Very Little Cash

RAM Cram: Our readers' selection of more RAM as the most-requested extra is a smart choice to get the best performance out of notebooks. As with desktop systems, adding RAM can boost productivity enough that it pays for itself very quickly by increasing performance and letting you run more applications at once.

A 14.4Kbps modem is high on the readers' wish list. (Note that we polled readers online and many were dialed in at sub-9,600 bps speeds.) After that, the percentages drop sharply, leaving docking stations as something that fewer than 10 percent of readers would add. This indicates that mobile users recognize the trade-offs inherent in a faster, smaller computer. Although a good docking station can overcome some shortcomings, dropping desktop prices almost makes it feasible to have two computers.

Users Speak Out



SOURCE: PC COMPUTI

The world is divided into two types of people: Those who divide people into two types, and those who don't. The world of portable PC users is also divided into two types: One sees a notebook PC as a sometime thing—a tool like a shaving kit, which they'll cart on trips and use only if they have to. For these people, the smart move is to pay as little as possible for a notebook. This section is for those users. (For notebook users who need higher-end machines, see "Mobile Computing Means Compromise," page 158.)

But even notebook minimalists have come to expect some refinements as standard equipment, whether their machine resides on a desktop or on a drop-down tray of a 727. These days, it's expected that a notebook will have a color display (active-matrix, passive-matrix, or dual-scan—at these prices we're not fussy), at least a 33MHz 486 processor, no less than 4MB of RAM, and a hard drive no smaller than 160MB. We asked for all this on an RFP—and, oh, by the way, it couldn't weigh more than 7 pounds or cost more than $2,000. We were overwhelmed with responses, which means that the low-end notebook market has become largely a commodity business. Today you can find standard features, such as bigger hard drives and faster processors and color, that were prime extra-cost items 12 months ago. There couldn't be a better time to get a portable PC even if you think you'll use it only rarely.

A few manufacturers responded with notebooks that just didn't make the price cut, but most low-cost notebooks matched the bill. From them we picked three that offer a wide range of possibilities—MidWest Micro's Elite Dual-Scan Color SoundBook, Dell's Latitude 433C, and IBM's ThinkPad 360CS. One of them shone in performance, another at battery longevity, and yet another at screen quality, plus styling and frills. We invited each notebook maker to suggest optional improvements, but in all instances they pushed the price over $2,000. Still, browse through the extras as long as you're here.

The chasm of differences among the notebooks meant we had to approach evaluating them differently from the desktop systems, which are more homogenous. In desktop systems, performance is the great differential. But in notebooks, ease-of-use features such as the keyboard and pointing device weigh much more heavily than they do on desktop systems.

Attention to design details is even more important on a low-cost notebook that will be used occasionally than it is on notebooks that vie with your desktop for heavy use. When you divide your time evenly between a desktop and a notebook, your fingers become bilingual, so to speak. You can, for example, find the cursor keys on either keyboard without having to think about it. But if you use a notebook only lightly, you'll find your fingers reaching for keys that aren't where you'd expect to find them. And there is no such thing as a standard keyboard layout in portable computers like the couple of standard styles available among desktop systems. Some notebook makers still persist in putting the Ctrl key under the Tab key, a layout idiosyncrasy that hasn't existed on a desktop since the days of the IBM XT. If you're checking out a notebook in a showroom, close your eyes and try to hit keys such as Alt, Ctrl, Home, End, Page Down, Page Up, and the arrow keys. Remember, it doesn't matter that a notebook's hard drive has a couple of milliseconds faster access time if you waste megaseconds fumbling with the wrong keys.

The Bottom Line This may sound like self-evident advice, but consider your portable computing needs carefully. Much more than in the case of a desktop computer, you will be performing a balancing act with what you want on one side and what you're willing to sacrifice on the other. A simple example: You want the lightest notebook you can get, but to get it you'll sacrifice a color screen and a floppy drive at the very least.

Add the fact that notebook preferences are highly person-dependent. All I care about might be performance, so I can't make a recommendation for someone who values ergonomics above all. Although one system might satisfy both needs, the odds aren't too good. And notebooks are far more limited than desktop PCs in how they can be upgraded. Be careful: The portable you buy now is one you're likely to have for a long time.

Constructing a Low-Cost Color Portable

What It Costs to Add the Most Requested Options

	Configuration	14.4Kbps Modem	8MB of RAM	Better Display	Docking Station	Faster CPU	240MB Hard Drive	Sound	Price with Options
Elite Dual-Scan Color SoundBook MidWest Micro (800) 728-8582 $1,999* *Reader Service No. 701*	CPU: 33MHz 486SX RAM: 4MB Disk: 260MB	$179	$239	N/A	$489	Varies	Included	Included	$2,906
ThinkPad 360CS IBM (800) 772-2777 $2,349* *Reader Service No. 702*	CPU: 33MHz 486SX RAM: 4MB Disk: 170MB	N/A	N/A	N/A	$599	N/A	N/A	N/A	$2,948
Latitude 433C Dell Computer Corp. (800) 613-3355 $2,199* *Reader Service No. 703*	CPU: 33MHz 486SX RAM: 4MB Disk: 340MB	$249	$229	N/A	N/A	$300	Included	$249	$3,226
ActionNote 700C Epson (800) 374-7300 $2,749* *Reader Service No. 704*	CPU: 33MHz 486DX RAM: 4MB Disk: 120MB	$239	$399	N/A	N/A	N/A	$150	N/A	$3,537
ActionNote 750C Epson (800) 374-7300 $2,649* *Reader Service No. 705*	CPU: 50MHz 486DX RAM: 4MB Disk: 260MB	$239	$399	N/A	N/A	N/A	Included	N/A	$3,287
Ascentia 800N AST (800) 876-4278 $2,199* *Reader Service No. 706*	CPU: 33MHz 486DX RAM: 4MB Disk: 250MB	$249	$206	N/A	N/A	N/A	N/A	N/A	$2,654
ColorBook SX33 Gateway 2000 (800) 846-2062 $1,799* *Reader Service No. 707*	CPU: 33MHz 486SX RAM: 4MB Disk: 250MB	$50	$249	$340	N/A	N/A	Included	N/A	$2,438
Globalyst 130 AT&T (800) 509-9606 $1,997* *Reader Service No. 708*	CPU: 33MHz 486SX RAM: 4MB Disk: 200MB	$395	$295	N/A	N/A	N/A	N/A	N/A	$2,687
Meridian 400C Zeos Int'l. (800) 554-5218 $1,995* *Reader Service No. 709*	CPU: 50MHz 486DX RAM: 4MB Disk: 175MB	$199	$196	$700	N/A	$300	$95	$279	$3,764
TravelMate 4000M Texas Instruments (800) 848-3927 $2,799 est. street price* *Reader Service No. 710*	CPU: 50MHz 486DX2 RAM: 4MB Disk: 340MB	$260	$240	N/A	$765	N/A	Included	Included	$4,064

*NOTE: PRICES UPDATED AS OF PRESS TIME.

MIDWEST MICRO ELITE DUAL-SCAN COLOR SOUNDBOOK

Sing to Me, Baby

NOTE: WINSTONE 95 RUNS 15 OF THE MOST POPULAR WINDOWS BUSINESS APPLICATIONS

PC Best

The first thing you notice when you boot Windows on MidWest Micro's Elite Dual-Scan Color SoundBook is the same cheerful "Ta-da" that greets Windows users on a multimedia desktop PC. A sound adapter is embedded in this notebook.

But the SoundBook is not just bells and whistles. The 33MHz 486SX notebook was the best performer of the three low-cost portables. A lot of that performance can be attributed to a fast 260MB hard drive and a zippy, perfectly legible, dual-scan color screen.

The SoundBook's battery life is decent, if not outstanding, and we particularly liked the LCD indicator that tells when the battery is finished charging. Our worst complaint about the SoundBook is that the trackball is awkward to use.

TECHNOLOGY: *Dual-scan screen and sound, too.* ****

VERDICT: *A peppy, playful notebook you'll enjoy using.* ****

FILEBOX

As Tested: 33MHz 486SX, 4MB of RAM, 260MB hard drive, sound, VESA local bus, two PC Card slots, 10.3-inch display.

Weight: 6.7 pounds with power supply.

$1,999
MidWest Micro
(800) 728-8582
Reader Service No. 701

IBM THINKPAD 360CS

A Solid Notebook

NOTE: GRAPHICS WINMARK IS A WINBENCH 95 TEST MEASURING VIDEO PERFORMANCE.

IBM's ThinkPad 360CS is an updated version of the IBM ThinkPad 500 that won a *PC Computing* MVP Award in 1993. The latest version has two PC Card slots, better battery management, and a bigger—170MB—hard drive. The things we've always liked best about the ThinkPad haven't changed: full-sized keys that feel like you're using a desktop PC; a bright, 9.5-inch active-matrix display; and the handy TrackPoint II eraserhead pointing device embedded in the middle of the keyboard.

The ThinkPad 360CS's performance is slouchy compared to MidWest Micro's Elite Dual-Scan Color SoundBook, except when it comes to graphics. The ThinkPad 360CS is a good solid portable at a decent price. It's just lagging behind the leading edge of notebook technology.

TECHNOLOGY: *No sound or advanced chip sets here.* ***

VERDICT: *Solid if not overwhelming performance.* ***

FILEBOX

As Tested: 33MHz 486SX, 4MB of RAM, 170MB hard drive, two PC Card slots, 9.5-inch display.

Weight: 6.2 pounds with power supply.

$2,349
IBM
(800) 772-2227
Reader Service No. 702

DELL LATITUDE 433C

Low on Ergonomics

NOTE: THE ZDKBT BATTERY TESTS SIMULATE COMMON USER ACTIVITY.

Of the portables we tested, Dell's Latitude 433C was in many ways our least favorite. For starters, it finished last in many of the benchmark tests—although IBM's ThinkPad 360CS never beat it by a significant margin. More important, the Latitude 433C's keyboard and trackball were awkward.

The keyboard's Shift, Alt, and Tab keys are too small, and the Home and End keys must be pressed in conjunction with a special function key. The wrist support area is too small and the trackball, which is located below the space bar, takes a while to get used to.

The Latitude 433C has the best battery life among the lower-priced notebooks we considered, and its dual-scan display is better than average. But those benefits don't outweigh its shortcomings.

TECHNOLOGY: *Best batteries by far.* ****

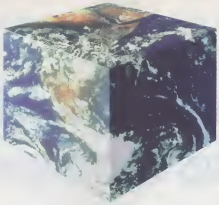
VERDICT: *You can get the same performance for the same money from IBM's ThinkPad 360CS.* ***

FILEBOX

As Tested: 33MHz 486DX, 4MB of RAM, 340MB hard drive, two PC Card slots, 9.5-inch display.

Weight: 6.0 pounds with power supply.

$2,199
Dell Computer Corp.
(800) 613-3355
Reader Service No. 703



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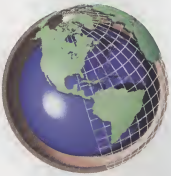

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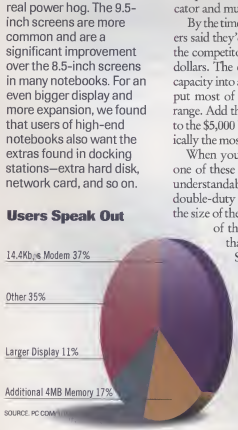
Circle 193 on reader service card.

Mobile Computing Means Compromise

Modem #1: Our survey shows a more even distribution of user preferences when it comes to high-performance notebooks than there is with low-cost notebooks.

Modems take first place in this RFP. Perhaps because readers already expect these systems to be high-performance, the modem replaces RAM, which was first on low-cost portables. Our survey also turned up that people want larger displays. How large? The largest widely available notebook screen is 10.4 inches—and it's a real power hog. The 9.5-inch screens are more common and are a significant improvement over the 8.5-inch screens in many notebooks. For an even bigger display and more expansion, we found that users of high-end notebooks also want the extras found in docking stations—extra hard disk, network card, and so on.

Users Speak Out



SOURCE: PC COMPUTING

If you're not one of the notebook PC users for whom price and simplicity are all that counts (see "Cash and Carry—Very Little Cash," page 154), then you must belong to the other half of the notebook community—those who want a notebook to be a complete replacement for a desktop PC. You can almost get there, but there's a catch: For portability, you have to give up something—keyboard size, mouse, speed, display size, hard drive size. If you really want to take the capabilities of your desktop on the road, get a wheelbarrow.

But if you're willing to spend a few more bucks, you can buy some of the conveniences of a desktop PC. We asked manufacturers to give us proposals for color portables that have at least a 50MHz 486 or Pentium processor, a 240MB or larger hard drive, 8MB of RAM, and one or more PC Card slots. We also said it must have as an option either a docking station or a port replicator and must cost less than $4,000.

By the time we added the options that our readers said they'd most like to have, the prices of all the competitors had jumped by several hundred dollars. The effort of putting speed and storage capacity into a portable cost enough on its own to put most of the candidates in the $3,000-plus range. Add the extras, and the prices easily shoot to the $5,000 bracket. A docking station was typically the most expensive extra-cost item.

When you're paying as much as you are for one of these high-performance notebooks, it's understandable if you think it should also do double-duty as your desktop machine. But with the size of their hard drives and the convenience of their PC Card slots, you may find that—unless you need to connect to SCSI devices—a docking station really isn't necessary.

Of all the extras available on notebook PCs, we recommend a large hard drive and more RAM. Memory just makes Windows run faster, and you can't have too much of it. As for drive size, when a word processor by itself can claim up to 30 megs of hard drive real estate, you should never underestimate your drive needs. If you can't afford the bigger drive, use a disk compression program such as DoubleSpace or Stacker. In fact, even if you can afford the bigger disk, use a disk compression program.

We didn't even get a nibble from a Pentium, but the vendors came up with some other systems and we picked three. Each nicely illustrates some technological advantage, but unfortunately, none has all—or even two, for that matter. One spins on the edge of technology with a blindingly fast hard drive, another offers great battery life, and the third uses superior technology to handle RAM. It's as if we picked AT&T's Globalyst 200, Dell's Latitude XP 475C, and Texas Instruments' TravelMate 4000M as the subjects of a morality play to illustrate how greed for everything in a portable can come to no good end. Well, we didn't. But because it turns out that way anyhow, we're certainly going to take advantage of it.

The Bottom Line What's too heavy to carry with you wherever you go and too clumsy to use when it's sitting at your desk? That's right, any notebook you can find. Even if you're willing to spend $4,000 (double the amount of money we allocated for a low-cost notebook) you're still not going to have a notebook computer that will be a true desktop replacement.

The key trade-offs tend to be in ergonomics rather than performance. The keyboard and pointing device in a notebook just won't be as human-compatible as those on a desktop. But you can expect the same powerful CPU and nearly as much memory as you can get in your desktop. A docking station can solve some problems—you can add more hard disk, a larger monitor, better keyboard, and so on—but it also adds so much to the price that it can be more cost-effective to purchase a separate desktop system.

If you're willing to blow a lot of money on a color notebook, you may be disappointed if you try to use it as a desktop replacement. Using a portable invariably involves some sacrifice that money can't fix. At least, so far.

All that said, if your needs are for high-performance mobile computing (if you're delivering resource-hungry multimedia presentations or developing applications on the road) the three systems we tested all have something to offer.

Constructing a High-Performance Color Portable

What It Costs to Add the Most Requested Options

	Configuration	Docking Station	Port Replicator	14.4Kbps Modem	More RAM	Faster CPU	Larger Hard Drive	Sound	Better Display	Price with Options
Globalyst 200 AT&T (800) 509-9606 $3,484* *Reader Service No. 711*	CPU: 75MHz 486DX4 RAM: 8MB Disk: 340MB	$295	$95	$395	$295	N/A	N/A	N/A	N/A	$4,564
TravelMate 4000M Texas Instruments (800) 848-3927 $4,639* *Reader Service No. 712*	CPU: 75MHz 486DX4 RAM: 8MB Disk: 341MB	$765	N/A	$260	$240	N/A	N/A	Included	N/A	$5,904
Latitude XP 475C Dell (800) 613-3355 $3,399* *Reader Service No. 713*	CPU: 75MHz 486DX4 RAM: 8MB Disk: 340MB	N/A	$199	$249	$249	N/A	$300	$249	N/A	$4,645
ActionNote 766CX Epson (800) 374-7300 $3,499* *Reader Service No. 714*	CPU: 66MHz 486DX2 RAM: 8MB Disk: 340MB	N/A	N/A	Included	$399	N/A	Included	N/A	N/A	$3,898
Ascentia 900N 4/75 AST (800) 876-4278 $3,259* *Reader Service No. 715*	CPU: 75MHz 486DX2 RAM: 8MB Disk: 340MB	$489	$114	$249	$206	N/A	N/A	N/A	N/A	$4,317
ColorBook DX4-75 Gateway 2000 (800) 846-2062 $3,248* *Reader Service No. 716*	CPU: 75MHz 486DX4 RAM: 8MB Disk: 340MB	N/A	N/A	$149	$1,000	N/A	N/A	N/A	N/A	$4,397
Meridian 800C Zeos Int'l. (800) 554-5218 $2,295* *Reader Service No. 717*	CPU: 50MHz 486DX2 RAM: 4MB Disk: 175MB	N/A	N/A	$199	$196	$300	$95	$279	$800	$4,164
Slimnote 5100T Twinhead (800) 545-8946 $4,199* *Reader Service No. 718*	CPU: 100MHz 486DX4 RAM: 8MB Disk: 340MB	$599	$199	$199	$460	N/A	$200	Included	N/A	$5,856
Versa V/50D NEC (800) 374-8000 $2,999* *Reader Service No. 719*	CPU: 50MHz 486DX2 RAM: 8MB Disk: 250MB	$629	$99	$339	$259	N/A	$300	N/A	$830	$5,455
Z-Noteflex Zenith (800) 582-0524 $3,534* *Reader Service No. 720*	CPU: 50MHz 486DX2 RAM: 4MB Disk: 340MB	$799	$204	$299	$279	$849	$609	Included	$2,189	$8,762

*NOTE: PRICES UPDATED AS OF PRESS TIME

AT&T GLOBALYST 200

A Spectacular Notebook

NOTE: WINBENCH 96 MEASURES GRAPHICS AND DISK PERFORMANCE IN WINDOWS 3.1

PC Best

If there were nothing else, AT&T's Globalyst 200 would get the prize for best Star Trek prop: The two-tone gray case with its streamlined trackball bold power button say that this is one cool machine.

But there's something else—the fact the Globalyst 200 runs down everything else we tested it against under Windows. The reason for the spectacular performance is the fact that its 340MB Areal hard drive uses glass platters instead of the more common aluminum variety. Glass platters can spin faster and have a greater density for larger data storage.

But AT&T's Globalyst 200 wasn't simply a speed demon. The 9.5-inch, active-matrix display is crisp and bright, and the system has decent battery life. You'll definitely want to show the Globalyst 200 off in coach class.

TECHNOLOGY: *The choice of hard drive is excellent.* ★★★★
VERDICT: *If speed counts, choose the Globalyst 200.* ★★★★★

FILEBOX

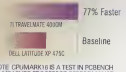
As Tested: 75MHz 486DX4, 8MB of RAM, 340MB hard drive, two PC Card slots, 9.5-inch display.

Weight: 6.3 pounds with power supply.

$3,484
AT&T Global Information Solutions
(800) 509-9606
Reader Service No. 711

TEXAS INSTRUMENTS TRAVELMATE 4000M

All-Around Performer



NOTE: CPUMARK16 IS A TEST IN PCBENCH TO MEASURE PROCESSOR PERFORMANCE.

All of the other computer makers should take a look at what Texas Instruments is doing with memory in its TravelMate 4000M notebook. In benchmarks that measure raw processor power, the TravelMate soared well ahead of all comers, but in areas involving video and disk access, it fell behind AT&T's Globalyst 200.

The keyboard and wrist rest are comfortable and well laid out, except for the eraserhead pointing device, which is located at the center of the wrist rest instead of being among the keys as on IBM's ThinkPads. But the biggest disappointment with the TravelMate is its display size—8.5 inches. While the 1-inch difference between it and other notebooks doesn't sound like much, it's noticeable. But the TravelMate's built-in sound helps compensate for the lost screen area.

TECHNOLOGY: *Excellent memory and processor.* ★★★★
VERDICT: *A good, chipper, all-around notebook.* ★★★★

FILEBOX

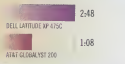
As Tested: 75MHz 486DX4, 8MB of RAM, 341MB hard drive, two PC Card slots, 8.5-inch display, built-in sound.

Weight: 6.5 pounds with power supply.

$4,639
Texas Instruments
(800) 848-3927
Reader Service No. 712

DELL LATITUDE XP 475C

Methuselah's Battery Life



NOTE: THE ZDICIT BATTERY TESTS SIMULATE COMMON USER ACTIVITY.

If you're the type who needs to work continuously during cross-country flights, Dell's Latitude XP 475C is the notebook PC you've been looking for. Its lithium-ion battery, in conjunction with some intelligent power-management features, keep the Latitude running one to two hours longer than the other high-end notebooks.

The Latitude has a 75MHz 486DX4 processor, but it still trailed in most of our benchmarks. Although it might seem hard to believe, in some tests it even lagged behind MidWest Micro's 33MHz 486 Elite Dual-Scan Color SoundBook.

Only a couple of keys are undersized, and both the keys and trackball—located with overstized buttons in the center of the wrist rest—are easy to use. All in all, it's not an exciting notebook, unless you need every last drop of battery juice.

TECHNOLOGY: *The battery is as leading edge as you can get.* ★★★★
VERDICT: *For battery life, look no further. If not, keep looking.* ★★★

FILEBOX

As Tested: 75MHz 486DX4, 8MB of RAM, 340MB hard drive, two PC Card slots, 9.5-inch display.

Weight: 6.0 pounds with power supply.

$3,399
Dell Computer Corp.
(800) 613-3355
Reader Service No. 713

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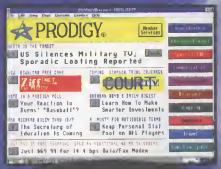
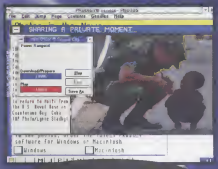
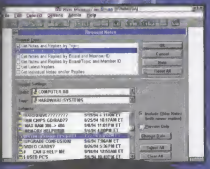


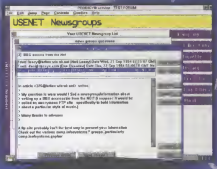
New Look and Feel



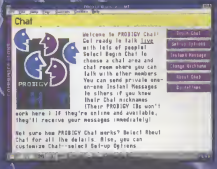
Pull Down Photos



Power Tools



Internet



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AGFA Agfa

The complete picture.

Circle 168 on reader service card.

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The Price of Progress

It used to be so easy. You bought the best off-the-shelf PC your budget would allow. Of course, neither the budget nor the PC were ever enough. So then you spent the next year or two or three upgrading that bare-bones PC until it was a god-awful terror of a hot rod.

It was a form of buying on the installment plan—one big down payment (the PC itself) and then a bunch of little payments to perk up this, tune up that, and double that other thing. Allow me a couple of personal excursions, and I'll show you what I mean.

I bought my first PC in '80 or '81—whenever *Time* named the PC as Man of the Year. It cost $3,500, and I thought it was one hot mama of what were then called, sometimes jokingly, IBM compatibles, because my PC had twice as much memory as a genuine IBM PC—a whole, whopping 128K. For the next several years I kept my 8088 PC one of the meanest machines in my local user group by increasing RAM to 640K, then buying a memory board to add—somebody stop me, please!—two megs of RAM. I replaced the monochrome monitor with a color display. But the pièce de résistance was plugging in a card that supplied a 286 processor—the computer equivalent of a heart transplant.

It's 1980. I'm upgrading to **TWO** *megs of RAM! My God! Somebody* **STOP** *me,* **PLEASE!**

Second excursion. A couple of years ago, I had this great scam going at *PC Computing*. I talked the powers that be into buying me any outrageous computer component I wanted, just so long as I wrote about it. The readers, see, would get this vicarious thrill from reading about me creating this ultimate PC. Well, that worked for a bit.

And then recently we came up with the idea of asking computer manufacturers to put together their own ultimate PC configurations. Only this time, we'd be realistic about it. Give them a budget to work within—a classic request for proposal (RFP). But, we thought, we'll see what we can do to push these out-of-box PCs even further by replacing their components with even faster, bigger, cooler ones. We'd show those computer makers what ultimate really means.

Oh, and I tried, and I made a little progress with the Pantera 90 from Zeos that was the winning response to our request for high-end desktop proposals. I replaced its monitor with Nanao's FlexScan T2•20, a *PC Computing* MVP Award winner (see "The Editors' Choice," December 1994, page 139). And it didn't take many smarts to replace its speakers with a Bose Acoustimass sound system. And so on.

Those were all solid, if tangential improvements. But then I got to hard-core performance. I replaced the Pantera's Diamond Stealth video card with another MVP Award winner, Matrox's MGA Impression Plus. Graphics performance improved, but enough to be worth the time or money? No way. I had preordered a 1GB Caviar AC31000 hard drive from Western Digital, but the Pantera already had a 1GB drive. I also had a Promise Technology caching IDE disk controller waiting, but the Pantera's own disk controller is built in to the motherboard and can't be disabled. So what's left? One of those keyboards shaped like a stoned snake? Get real.

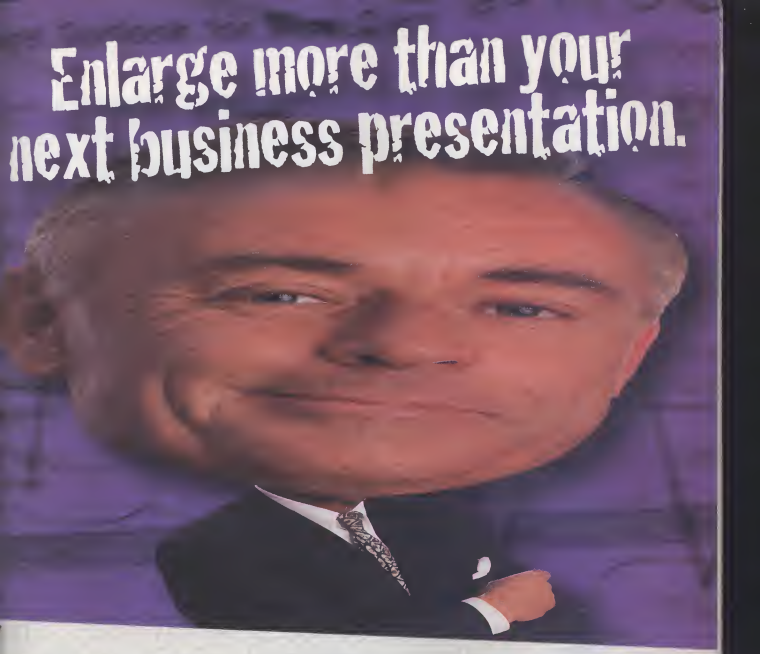
All in all, I'd say I flopped big time at squeezing any more ultimateness out of any of the top picks in our RFP project. Today, you can get 90 percent of what I struggled to put together by checking a few boxes on an order form—and you can do it for about one-tenth the $30,000 or so I put into creating my ultimate PC.

Oh, of course it's not as much fun as spending hours flipping DIP switches, changing jumpers, trying different interrupt settings, and praying some weird combination isn't going to short out the whole system. But boredom is the price you pay for progress.

RON WHITE *is a senior contributing editor at* PC Computing *and remembers when . . . .*

PHOTOGRAPH BY JAMES MCCOON

Enlarge more than your next business presentation.



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Circle 261 on reader service card.

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- 340 Million Bytes (=320MB) or 260 Million Bytes (=250MB) HDD
- 8MB RAM expandable to 24MB
- 6.5 lbs.

T2400CS FEATURES:
- i486™DX2/50MHz, 3.3v
- 8KB cache
- 9.5" dia. color Dynamic-STN dual-scan display
- 340 Million Bytes (=320MB) or 260 Million Bytes (=250MB) HDD
- 4MB RAM expandable to 20MB
- 6.5 lbs.

ALL MODELS:
- Integrated math coprocessor
- Two PCMCIA slots (14.5mm/5mm)
- VL local-bus video
- SCSI-II Port
- NiMH battery with Toshiba MaxTime™ Power Management
- 3.5" 1.44MB floppy disk drive
- MS-DOS®, Microsoft Windows™ for Workgroups pre-installed
- Toll free technical support – 7 days a week, 24 hours a day

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Introducing the Satellite Pro™ Series: high-performance notebooks at an affordable price. Offering scorching i486™ processors up to 75MHz and hard drives as big as 500MB.

These notebooks have impressive flexibility, with instant Plug and Play connection to all your peripherals. A built-in SCSI-II port and optional 16-bit sound card give you access to multimedia: audio, video and CD-ROM.

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Circle 215 on reader service card.

ROI ANALYSIS

Secret Weapons

SYNOPSIS

THE INTERNET: *You know it's out there, but how do you use it to your advantage?* **170**

DOCUMENT MANAGEMENT: *Harness the material on hand to get a step up on the competition.* **172**

REMOTE ACCESS: *Tactics for staying in constant touch.* **174**

GROUPWARE: *Join the business software revolution!* **176**

POWER FAXING: *New fax technology can put you ahead.* **182**

25 MAGIC BULLETS: *Ammo that gives you an edge.* **186**

REALITY BYTES: *How to fight dirty.* **188**

Business is war. There are commanders and there are troops. There's secret research and constant reconnaissance. You attack with your strengths and defend where you're vulnerable. Alliances, invasions, assaults, raids, and fortifications—the only real difference between business and armed conflict is that you're fighting over market share instead of borders or ideology. And just as an army does, you need to develop secret weapons before someone else develops them and uses you as a target. In all likelihood, you already have a cache of secret weapons. Most of them are people—the employees you've been priming until exactly the right moment. But people can't do everything by themselves. Like soldiers, they need support from the technologies around them.

Here are five business weapons—the Internet, document management, remote access, groupware, and power faxing—that will strengthen your campaign. They won't just save you money, they'll earn it for you. They offer incredibly cost-effective strategies that will sharpen your competitive edge and earn you the spoils due the victor. They'll make you more organized, more up-to-date on competitive information, and more tightly connected with the troops. The result: a more successful company.

The strategy behind these secret weapons is that they alter the balance of power. You may make the best darn widget in the world, but without a supereffective structure to manufacture, market, and distribute it, you're dead in the water. If you're armed properly, you can move before the competition is ready, or at the very least, defend yourself against the competition's advances. You can exploit your strengths and give your troops constant access to the tools they need to make a difference.

These weapons make the difference between thriving and simply surviving: a difference that justifies all the resources you can muster.

BY NEIL RANDALL

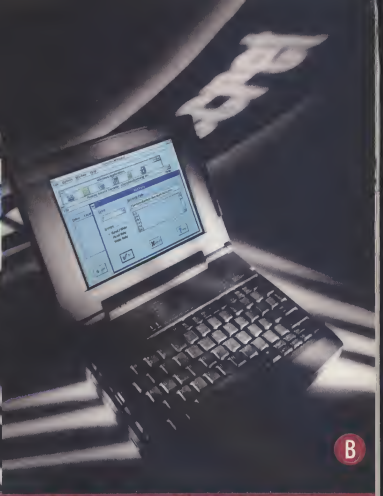
A THE ON-RAMP: With full Internet access you can fulfill your mission of competitive success.

B TOTAL ACCESS: Send and receive crucial data fast from any remote location. Complete desktop access can be your most valuable asset.

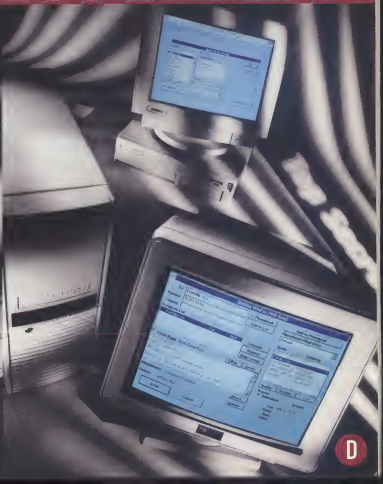
C ON FILE: Scan, store, and manage documents. They're your workgroup's ammunition for battle.

D TARGET RANGE: Here are your tools for superfaxing so you can get the job done faster when it counts most.

PHOTOGRAPHS BY ARNOLD TURSKO



It's Your Move: With your business' future in the balance, you'd better fight to win.

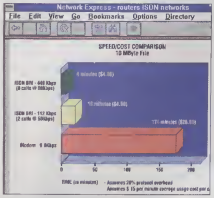


The Net **Connection**

Now that the Internet's a reality and the shackles that hindered its business use have been removed, you may be wondering how it's going to translate promise into competitive advantage. It's true that the Net offers you global e-mail, constant updates to government information, an opportunity to expand customer support to the entire world, a huge reservoir of research resources, and new opportunities in marketing and advertising. But can it deliver? With a few caveats, yes.

THE PROBLEM: *You want instant access to a broad spectrum of timely competitive data without having to subscribe to several expensive research services.*

THE SOLUTION: Establish a high-speed Internet connection. This is the most expensive solution, although with integrated services digital network (ISDN) coming into play, high-speed connections are quickly becoming more realistic. You'll need a service provider and a high-speed switched-56Kbps line, or, if you have the funds to do it, a full T1 or even T3 line for maximum speed. An ISDN line will cost $30 to $100 per month, a leased line will run about $250 to $400 per month, and a T1/T3 line will be in the ballpark of $5,000 to $25,000 per month. You'll need high-quality hosts (usually Unix) and a full range of Internet software for every PC on your office network. Once it's all in place, you're ready to hit the ground racing. Sound daunting? It needn't. Internet access can be had inexpensively. As your needs increase, you'll find it cost effective to spend more on faster and higher-capacity access.



Connection: Mosaic is a front end to Internet access over a high-speed switched-56Kbps line. The combination puts current data at your fingertips.

THE PROBLEM: *You've got 20 users on the Internet, each working under his or her own name. If you're paying for the lines, you want to leverage the opportunity to establish a corporate presence amidst a potential audience.*

THE SOLUTION: Register your own domain name. If your company's name is Fine Stuff, Inc., why should your e-mail address read joesmith@provider.net? Along with your initial connection, your service provider should be willing to help you register a unique name so that your e-mail, FTP, World Wide Web, and Gopher addresses all share the finestuff.com label.

Make sure that employees dialing in can also have the finestuff.com domain name, whether or not they're working from a different type of account with the provider. This way, every time you go online you're building a corporate image—and the exposure is practically free, since you're paying for the service anyway. While some service providers will set up a domain name at no extra charge, others will bill you up to $50.

Your Domain: When you register your own domain name, you become a presence on the Net—as Digital Equipment Corp. has here.

THE PROBLEM: *You're spending too much money on the time it takes several employees to peruse the Net in search of information.*

THE SOLUTION: Establish your own Gopher, World Wide Web, and FTP servers. The Net is flooded with information, but your employees don't have time to search for it. By establishing servers for FTP downloads, Gopher directories, and World Wide Web pages on your company's host machines, you'll be able to offer continually updated information. The server plus the labor to install it will cost-up to $5,000. But once you have it up and running, you can equip an information specialist with Internet access tools like NetCruiser from NetCom (see "One-Stop Net Shopping," November 1994, page 121), or Spry's Internet in a Box. Or try InterneWorks from Book-Links Technologies, which

Update: *PC Computing*'s presence on the World Wide Web lets us offer continually updated information to our readers and colleagues.

was recently purchased by America Online. Frontier Technologies' SuperTCP for Windows offers an alternative product. The Pipeline, from the same-named company, is free software but you'll pay access fees.

THE PROBLEM: *You want everyone to be fluent in Internet skills and your staff is eager to go. But simply sending them forth on their own risks wasting precious hours. What to do?*

THE SOLUTION: Take advantage of the resources available offline. Mastering the Internet takes time, patience, and training. But while everything you need is on the Net itself, you can be much more efficient by making use of the increasing horde of offline materials available to you. These include books, CD-ROMs, seminars—everything you could possibly want to know is out there in the bookstores, the computer shops, and the training rooms (see "Bookshelf: Internet Yellow Pages," September 1994, page 125). Then get online, and watch productivity soar. To equip all of your employees, you may spend as little as a couple of hundred dollars or as much as a few thousand on books or CDs. Training seminars will cost more—often upwards of $2,000 to $3,000—but may be a more effective way to develop skills. You may want to train a few individuals and then slate time for them to share their new skills with their colleagues. The investment you make in training employees will pay off quickly and continuously as more vital information is exchanged and more business transactions are conducted online.

Resources: *The Whole Internet User's Guide & Catalog* is available online as well as in bookstores; other resources include CD-ROMs and seminars.

Quick Takes: Accessing the Internet

1. **When choosing a service provider,** accept nothing slower than a 14.4Kbps connection. A 28.8Kbps connection is even better. (Try NetCom Online Communication Services: 800-501-8649 or Performance Systems International: 800-827-7482.)
2. **Don't be fooled! The best World Wide Web** client software is free. Netscape and Mosaic offer front ends that will serve you well into the future. (Netscape Communications: 800-638-7483; NCSA Mosaic info@ncsa.uiuc.edu.)
3. **If someone offers you "full" Internet access,** demand a SLIP/PPP connection with the following features: WWW, Telnet, FTP, Gopher, WAIS, e-mail, and Usenet news.

Internet in a Box
Spry
(800) 777-9638
info@Spry.com
$100
Reader Service No. 726

InternetWorks
BookLinks Technologies
America Online
(800) 453-7673; $99
Reader Service No. 727

Mosaic
NCSA
info@ncsa.uiuc.edu
Free
Reader Service No. 728

NetCruiser
NetCom
(800) 501-8649
Free software, $25 startup fee, $19.95/month (plus added fees)
Reader Service No. 729

The Pipeline
The Pipeline
(212) 267-3636
info@pipeline.com
Free
Reader Service No. 730

SuperTCP for Windows
Frontier Technologies
(414) 241-4555
$395
Reader Service No. 731

The Whole Internet User's Guide & Catalog
O'Reilly & Associates
(800) 998-9938
$24.95
Reader Service No. 732

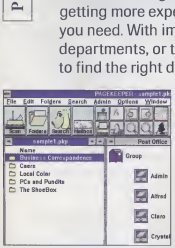
All Along the Internet: No matter what your task, the Internet can help—provided you have the right equipment. For research, all you need is a connection and an account. If you're publishing information, then you'll need a server—which means renting one from a service provider or setting up your own Unix system.

WEAPON THE **INTERNET** EDGE

1 Choose the task you want to accomplish.	2 Select the factor that defines your work	3 The most mission-critical technology solution is .
Research & Retrieval	LAN with 100 or More Users	High-Speed Connection
	Remote Users or Small LAN	Provider Dial-up Accounts
Information Publishing	In-House Site	Unix Server and Software
	Virtual In-House Site	Space Rental from Provider
Online Product Support	Electronic Mail	List Server Software
	World Wide Web	HTML Authoring Software

Scan It, Store It, Share It

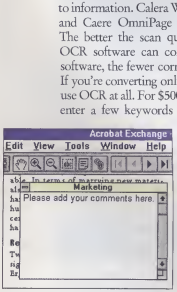
Document management problems aren't new. They're the reason we have filing cabinets, storage archives, and, for that matter, libraries. But storage space is getting more expensive, and there's a new urgency to locating the documents you need. With important materials scattered among different buildings, departments, or types of computers within a single department, being able to find the right document instantly can be a competitive weapon.



Convert: Caere's PageKeeper and other programs deliver total scanning and OCR capabilities. Link one of these with a high-quality scanner.

THE PROBLEM: *Your office is filled with paper. It's such a mess you can't find contact names, data, even your own business cards. How do you begin to organize the information so you can find what you need in an instant? And how can you get rid of all those stacks of paper?*

THE SOLUTION: If you need to convert paper documents to electronic format, buy the most precise scanner you can find (such as those from Pentax and Hewlett-Packard) and the most accurate OCR software on the market. You'll spend around $5,000 but earn time as well as flexible access to information. Calera WordScan, Caere PageKeeper, and Caere OmniPage Professional are good bets. The better the scan quality, the more easily your OCR software can convert it, and the better the software, the fewer corrections you'll need to make. If you're converting only for archival purposes, don't use OCR at all. For $500 to $4,000, you can just scan, enter a few keywords to associate with each document, and store bitmap images of the documents in accessible locations.



Share: Retain formatting with cross-platform document tools like Adobe Acrobat. Recipients can view and annotate text in its original format.

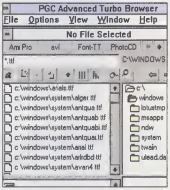
THE PROBLEM: *You need to share electronic documents and information across different platforms. But you can't afford to lose the files' formatting, so ASCII files and OCR software won't cut it.*

THE SOLUTION: Make an investment in an excellent cross-platform document exchange package. Adobe Acrobat 2.0, No Hands Software's Common Ground, Farallon Computing's Replica for Windows, and WordPerfect Envoy are all available for Windows users, each with its own strengths and weaknesses. (See "Buying Smarter: Macs and PCs—Can We Talk?" January, page 218.) The software will cost you $140 to $190 per person. Adobe also sells a workgroup version of Acrobat for $999.

A good cross-platform software program has lots of extras: Use it to manage not only documents created internally, but those received from outside as well. You can also use it to let clients annotate documents until they're tailor-fit. You'll save time and money by eliminating the need to shuttle proof layouts back and forth with collaborators, and you'll eliminate the incredible frustration that inaccurate or incomplete cross-platform file transfers can stimulate.

THE PROBLEM: *Your documents are in the computer now, but will you be able to access them as easily as you would if they were in your filing cabinet?*

THE SOLUTION: Make your documents archive accessible. Don't bury them on a separate machine or series of machines, and don't lock everything behind a password security system that requires employees to fill in forms and essentially apply to retrieve the documents they need. Docu-Magix's PaperMaster SE uses a file-cabinet metaphor. Except for truly sensitive material, put documents on the network and supply the best search-and-retrieval system you can get your hands on. Caere's PageKeeper, which costs $59 for a single-user version and $359 for a network edition, will do the trick. Pacific Gold Coast's Advanced Turbo Browser, for about $49, lets you view the text or graphics file before you retrieve it.



Find: You can locate, preview, and pull up files with search-and-retrieve programs such as Pacific Gold Coast's Advanced Turbo Browser.

THE PROBLEM: *You've got half your documents stored electronically, and the other half in legal files on the shelf. Having a half-modern system may be worse than having a whole old-fashioned one.*

THE SOLUTION: Don't scrimp on storage. With hard drives now dropping to roughly $450 per gigabyte, there's no excuse for not having enough storage to take care of immediate and even longer-range storage needs. And unless your archiving system lets you find past documents easily and efficiently, opt for additional hard disk space rather than tape storage. Tape is inexpensive, to be sure, and it does guarantee a fast return on your investment, but it's better for backup than for storing data that you may need to use. To truly use stored information as a competitive weapon, you need access to it. That means you want it available from your computer without a lot of waiting around. If your budget is limited, you might consider using a RAID system to put your budget to work with twice the results—storage and backup for the same dollars.

You should also consider creating CD-ROMs of your own; the costs to do so are plummeting (writable dual-speed drives are around $3,000, quad-speed drives, around $6,000), and entire document libraries can fit in a 6-disc changer or even larger CD jukeboxes. This way, your data is stored near-line, where it's electronically accessible but not taking up room on your active hard drive resources. A good search-and-retrieve tool will be imperative if your data exceeds what you can store on your active drive.

Store: There's still room on this hard drive. The cost of storage is coming down, making it the most affordable place to stash information.

Quick Takes: Tactics for Storing Information

1. **If you're putting paper documents into your PC,** you'll need buckets of storage space. Get big and fast storage and dedicate it as a departmental or company repository.
2. **If you're scanning a lot of documents,** run them in batches using a document feeder.
3. **Use a PIM or database** to track names, numbers, and events. If your document management software and PIM both do OLE, scan data in, turn it into an OLE object, and import it on the fly.

Acrobat 2.0
Adobe Systems
(800) 833-6687
$155
Reader Service No. 734

Advanced Turbo Browser
Pacific Gold Coast
(516) 759-3011
$49
Reader Service No. 735

Common Ground
No Hands Software
(800) 598-3821
$155
Reader Service No. 736

DS6
Pentax Technologies
(800) 543-6144
$449
Reader Service No. 737

Envoy
WordPerfect
(800) 321-4566
$160
Reader Service No. 738

OmniPage Professional
Caere
(800) 535-7226
$449
Reader Service No. 739

PageKeeper
Caere
(800) 535-7226
$59 (single user)
$359 (network edition)
Reader Service No. 740

PaperMaster SE
DocuMagix
(800) 362-8624; $99
Reader Service No. 741

Replica for Windows
Farallon Computing
(800) 425-4141
$79
Reader Service No. 742

ScanJet 3P
Hewlett-Packard
(800) 752-0900
$479
Reader Service No. 743

WordScan
Calera Recognition Systems
(800) 422-5372
$149
Reader Service No. 744

Data Quest: How you manage your documents depends on how you need to access them. If you simply want to view them, use a scanner and software with OCR and search-and-retrieve capabilities. To share documents, use cross-platform software. Finally, get lots of storage.

WEAPON THE RIGHT **DOCUMENT** SCHEME

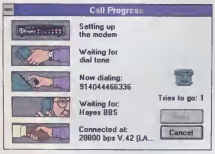
1 Choose the task you want to accomplish.	2 Select the factor that defines your work.	3 The most mission-critical technology solution is . . .
Paper to Electronic Format	Convert to Text	OCR Package
	Snapshot of Document Only	Storage and Search Software
Document Accessibility	Different Platforms	Cross-Platform Software
	Remote Users	BBS or LAN Front End
Document Storage	Continual Fast Access	Fast Multigigabyte Hard Drives
	Huge Libraries of Documents	CD-ROM Writers and Readers

Always By Your Side

It used to be easy, even on the road. A notebook PC and a modem were all you needed: Dial in, read, and answer e-mail. That was it. But now there's much more: You need to be out there continually, keeping the customer satisfied in a highly competitive environment. You need full access to the main office's network and all its tools. Groupware, presentations, updated quotes, and new features documents—you name it, you have to have it. And you shouldn't have to go home again to get it.

THE PROBLEM: *You're ready for remote access but the process of connecting to the office and downloading files is too slow to be useful.*

THE SOLUTION: Make sure everyone has a high-speed modem. Anything less than 14.4Kbps is unacceptable, especially if you're after remote control as well as remote access. You can pick these up for $120 to $150 apiece. Here's an even more cost-effective solution: Get 28.8Kbps modems ($280 to $400 each) on both the host and the remote machines. Until the V.34 standard shakes itself out, however, stick with like machines, rather than risking incompatibility between competing brands. Springing for 28.8Kbps may seem expensive at first glance, but it's much cheaper than being late for an appointment on the other side of the country. You may be surprised by how fast remote access equipment will pay for itself. Being able to work from anywhere on the road increases productivity enormously, which in turn earns back the cost of access in little time.



Speed: Modems with 28.8Kbps speed will reduce your phone bill and ease your remote users' frustrations about snail-paced file transfers.

THE PROBLEM: *Basic e-mail access is fine, but what your remote users really need is complete access to their desktop computers.*

THE SOLUTION: Consider using a remote-control package. These do far more than just file transfers. They let remote users dial in and use the software on their desktop machines as if they were sitting in the office. By using remote-control software, especially with a high-speed modem, you can keep your road warriors in the collaboration loop at all times, providing them access to groupware and other networking features. Symantec's Norton pcAnywhere is strong, as are Stac Electronics' ReachOut Remote Control and Norton-Lambert's Close-Up. Each costs less than $200.

Control: ReachOut Remote Control software from Stac Electronics is an inexpensive way to provide remote users with desktop access.

Remote-control software can be paired with fax software to integrate fax management into e-mail management. This makes managing and sharing data easier and reduces the response lag-time that workers may incur while on the road.

THE PROBLEM: *How do you make sure that your remote users—who are now so well-equipped that they can remain on the road for extended periods—stay in the loop on the kinds of decisions that get influenced by conversations at the office water fountain? And how do you manage them?*

THE SOLUTION: Set up your own bulletin board. A good BBS, such as PCBoard, Galacticomm's The Major BBS, and Wildcat (from Mustang Software), or a discussion database such as those found in Lotus Notes or OpenMind, can stock all the files, documents, and discussions a dial-in employee needs, and as a bonus it can keep excellent track of who's been accessing it, when, and what they've done with it. A BBS costs around $150 a month for a commercial service—less for shareware—and it can be a superb secret weapon, but only if it's maintained and updated continually.

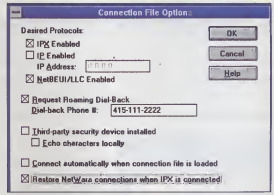
Information: Lotus Notes' discussion databases are an excellent way to extend topical conversations to offsite employees.

The beauty of a flexible system for discussion becomes clear when remote users get involved. It is precisely those folks who aren't around for casual idea-sharing who profit most from such channels as a BBS or discussion database. You may well

find that your investment in a vehicle for disseminating information will pay you back by providing ideas. Reticent staffers may speak up more on a bulletin board.

THE PROBLEM: *You've now got a dozen or more remote users and they're tying up your lines. How can they connect without crippling the main office?*

THE SOLUTION: If you have a large number of users who travel constantly and need full access to your LAN, try a remote-node package. For $2,500 to $6,000, products such as Shiva's LanRover/E for NetWare and Microcom's LANexpress (which includes four 28.8Kbps modems) establish the remote computers as full nodes on the network, with full capabilities. The price tag may look high, but think about it—your remote users are getting the best of both worlds: The ability to get their work done on the road without sacrificing their commitments at headquarters. For extra cost-effectiveness, it's even possible to combine remote-node and remote-control access using two separate products, all over the same modem.



Access: Shiva's LanRover/E for NetWare is a hardware and software combination that connects a remote user to your LAN as a full-fledged node.

Quick Takes: Across the Great Divide

1. **Look for all-in-one remote access** and remote management solutions that give you faxing, printing, online access, and e-mail capabilities.
2. **Turn your telephone into a remote tool:** Set up a telephony system to handle voice messages and fax requests, and provide fax-on-demand, fax-back, and phone- or fax-forward messages.
3. **If you want to limit remote access** to authorized users, choose a program with robust security features. Look for password protection and dial-back access.

Close-Up
Norton-Lambert
(805) 964-6767; $119
Reader Service No. 746

LANexpress
Microcom
(800) 822-8224
$3,499 (2-port server)
Reader Service No. 747

LanRover/E for NetWare
Shiva
(800) 458-3550; $2,899 (4 ports)
Reader Service No. 748

Lotus Notes
Lotus Development
(800) 346-1305
$995 Windows Starter Pack
Reader Service No. 749

The Major BBS
Galacticomm
(800) 328-1128; $225
Reader Service No. 750

Norton's pcAnywhere
Symantec
(800) 441-7234; $129
Reader Service No. 751

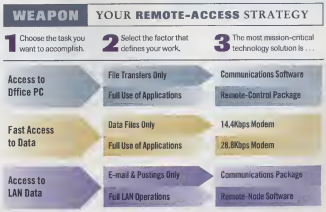
OpenMind
DCA
(800) 348-3221
$849 (server), $275 per client
Reader Service No. 752

PCBoard
Clark Development
(800) 356-1686
$150 to $7,000
Reader Service No. 753

ReachOut Remote Control
Stac Electronics
(800) 677-6232
$235
Reader Service No. 754

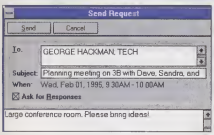
Wildcat
Mustang Software
(800) 999-0619
$129 (single user),
$249 (10 users)
Reader Service No. 755

So Far and Yet So Near: Remote users may be far from the office, but they don't have to feel the distance. Link travelers to their office PCs by using communications software with host capabilities. Modem and remote-control software combinations let remote users work as full-featured nodes on the office LAN.



Total Teamwork

Groupware offers many important advantages. By letting people work on projects together, sometimes in real time, groupware makes true collaboration possible. Unfortunately, the reality of groupware is that file formats collide, some employees prefer individual software, and the range of software tools you've assembled may not work well in a group environment. Plus, groupware needs group management. Here's how to capitalize on groupware's promises.

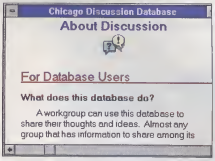


Plan: Microsoft's Schedule + lets you schedule appointments, personalize meeting requests and invitations, and reserve conference rooms.

THE PROBLEM: *Now that several busy people are involved in each step of a project, how on earth do you coordinate the electronic meetings so that the people who need to be present are there?*

THE SOLUTION: Spend $200 to $250 and adopt a workgroup scheduler like Microsoft's Schedule + or NetManage's Ecco to provide full control over meeting times. Getting people together for meetings is hard enough; depending on software to do the scheduling for you is inviting almost certain failure unless it makes all employees clear on exact timing, location, expectations, and so on. Make full use of the notes capabilities of these schedulers to provide additional information, and if room scheduling is available make use of it as well.

Workgroup schedulers should have varying access levels—so people who can't respond to meeting requests can designate an assistant to field messages. And being able to view blocked-off periods on everyone's schedule is an important bonus.



Learn: Groupware products tend to have thorough online help such as this, which describes in detail Lotus Notes' discussion databases.

THE PROBLEM: *Groupware programs can appear to be complicated. What's the best way to use them consistently to your best advantage?*

THE SOLUTION: Decide on a single workgroup communications package and set to work learning to use its features. Environments like Lotus Notes, WordPerfect Office (now GroupWise), Collabra Share, or DCA's Open Mind make possible all sorts of collaborative efforts. But if you use them sporadically, partially, or without standardization, they can impede rather than assist your progress. Their capabilities for managing information and projects over LANs and individual workgroups provide crucial advantages, and are often overlooked. For about $50 per user, groupware is worth the investment. But like all weapons, it must be used properly. (For an in-depth look at Lotus Notes, see "Notes: Mailboxes, Etc." July 1994, page 138.) Consider an investment in training. This will help you leverage your groupware to its maximum. Set some guidelines for how your groupwide applications are to be used. Finally, recognize that using groupware will require changes in how people work on a project.

THE PROBLEM: *The ability to communicate as a group is important, but what about the tools you need to accomplish specific tasks within the project, including the design and edit phases?*

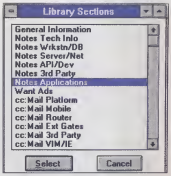
Edit: Many applications now have features such as Microsoft Word's annotations. Readers can pose their questions without disturbing basic text.

THE SOLUTION: Features that allow workgroup collaboration exist in word processors, spreadsheets, and other common applications. Make your colleagues fully aware of the annotation and OLE features of WordPerfect and Microsoft Word for Windows, and similar groupware support in Microsoft Excel and Lotus 1-2-3 for Windows. Similarly, groupware PIMs allow limited but important collaborative tracking among employees, and other applications are becoming increasingly group-aware. It's crucial to understand how these features work, and to

implement them both strategically and tactically. It's hard to determine exact costs for these weapons, but experts say you can equip employees for $500 each, including a word processor or spreadsheet, plus a PIM. Intel's ProShare lets you collaborate with remote users. For cross-platform work, design and edit documents, then share them for viewing and commentary. Programs such as Adobe Acrobat and Common Ground from No Hands Software (see page 173 for product information) lead the way in this sort of collaboration.

THE PROBLEM: *You're bound to run into special needs as your group work proceeds. Can groupware accommodate—even cater to—these needs?*

THE SOLUTION: Use online services for custom-designed groupware tools. The Lotus forum on CompuServe, for example, offers templates and custom applications for everything from group scheduling through sales-force tracking, and time and even expense management. Similar templates appear regularly on other online services for applications from NetManage, Novell, Symantec, and so on. You can adapt these templates and programs to your own needs, saving additional time and resources you might spend creating them from scratch. The work will cost you less than $100 per month and can give you a potential return on investment (ROI) of 1,000 percent in time savings alone. And of course, with the groupware category exploding, you'll see many more products available that will capitalize on the strengths of electronic teamwork.



Customize: Select templates and custom applications for workgroups from the Lotus forum and other sources.

Quick Takes: Plan Ahead to Work in Sync

1. **Groupware is the wave of the future** that s amassing power now, so plan ahead for how to take advantage of new capabilities.
2. **Object-oriented code means more** applications can be used together within a document.
3. **Define the size of your workgroup** before choosing your collaboration tools. The size of your workgroup will affect which tools you use and how you use them.

1-2-3 for Windows
Lotus Development
(800) 343-5414
$299
Reader Service No. 757

Collabra Share
Collabra
(800) 474-7427
$75 per user
Reader Service No. 758

CompuServe
CompuServe
(800) 848-8199
$8.95/month plus access fees
Reader Service No. 759

Ecco Professional 2.0
NetManage
(800) 457-4243
$180
Reader Service No. 760

Lotus Notes
Lotus Development
(800) 346-1305
$995 (Windows Starter Pack)
Reader Service No. 761

Microsoft Excel
Microsoft
(800) 426-9400
$299
Reader Service No. 762

Open Mind
DCA
(800) 348-3221
$949 (server),
$275 per client
Reader Service No. 763

ProShare
Intel
(800) 538-3373; $235
Reader Service No. 764

Schedule +
Microsoft
(800) 426-9400
$195 (2 users)
Reader Service No. 765

Word for Windows 6.0
Microsoft
(800) 426-9400; $289
Reader Service No. 766

WordPerfect
WordPerfect/Novell
(800) 321-4566; $250
Reader Service No. 767

WordPerfect Office (now GroupWise)
WordPerfect/Novell
(800) 321-4566
$695 (5-user pack for Windows)
Reader Service No. 768

Work Smart, Not Hard: Workgroup schedulers and e-mail more than suffice if you want to exchange messages and make appointments with colleagues without playing telephone tag. For more sophisticated collaboration and team project management, you'll need a full-featured workgroup package or suite.

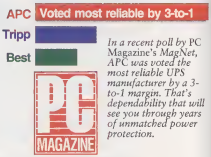
When all else fails,

Starting at $119

There are three types of computer users: those who have lost data due to a power problem, those who are going to, and those who have protected themselves against the inevitable surge, blackout or brownout with the most reliable UPS they can buy: Back-UPS by APC. In fact, editors and users alike agree that if your system demands absolute reliability, you can depend on APC Back-UPS.

According to a study by Bell Labs, undervoltages represent the overwhelming majority of power problems likely to hit your computer. The question is not if a failure will occur, but when. Whether due to construction, wiring, weather, other office equipment, or accidents, power problems are as inevitable as death and taxes. That's why you need instantaneous battery backup power from the Back-UPS to prevent data loss, hard disk crashes, and hardware damage.

If you're concerned about lightning, rest assured that when measured using the ANSI/IEEE 587 Category A test wave, Back-UPS are superior to virtually all separate surge suppressors. Surge performance is even backed by a $25,000 Lifetime Equipment Protection Guarantee.



In a recent poll by PC Magazine's MagNet, APC was voted the most reliable UPS manufacturer by a 3-to-1 margin. That's dependability that will see you through years of unmatched power protection.

PC MAGAZINE UK EDITORS' CHOICE

"The clear winner in price performance...it's unbeatable..."

August 1993
APC Back-UPS 1250

LIFETIME EQUIPMENT PROTECTION

$25,000

FOR AS LONG AS YOU OWN THE PRODUCT IF YOUR PROPERLY CONNECTED EQUIPMENT IS TOO DAMAGED BY AN AC SURGE, INCLUDING LIGHTNING, TO RUN AFTER THE UPS, WE'LL REPLACE OUR PRODUCT AND UPTO $25,000 OF CONNECTED EQUIPMENT. (SEE PRACT FOR DETAILS. VALID IN U.S. AND CANADA ONLY.)

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Back-UPS® prevail

"All other brands of UPS die regularly in this lightning prone environment. My APC won't die!" said Paul Sistilli, Systems Analyst, City of Fort St. Lucie. "With other brands, users don't find out until it is too late. The power interruptions here are very hard to live with. The other brands are dying off. Typically they last just beyond their warranty period. My Back-UPS is going on three years...no other brand is as reliable."

Don Truax knows first hand about Back-UPS reliability: "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked. Each morning I get a surge down the line and both APC's hate it - they simultaneously 'boiler 'n clamp' while my 'Brand T' quietly sleeps in. I've relegated that unit to non-critical household stuff like my VCR."

Andrew Wargo, Manager at Baxter Land Company, tried two other brands before Back-UPS. "One lasted a few days, a second one went up in smoke after 48 hours, a third lasted less than 24 hours! I then bought my Back-UPS for less than half of what I had paid for the others. We've purchased three more Back-UPS and for the past 14 months they've been just hummin' away on the same power line that was eating the other brands alive!"

If you're protecting a network server, a communications interface port (on models Back-UPS 400 and higher) provides the security of an automatic shutdown to all major OS including NetWare, Windows, Windows NT, LAN Server, LAN Manager, LANtastic, SCO Unix, OS/2, Banyan Vines, AppleShare/System7 and more, so your data is safe whether the system is attended or not. (PowerChute software and interface kits sold separately.)

And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution

More than... 2,000,000 Satisfied Users

APC has won more awards for performance and reliability than all other UPS vendors combined...including five consecutive LAN Times *Readers Choice awards...*

PC World Top 20 Upgrade

Windows Mag. Readers' Choice

LAN TIMES READERS' CHOICE 1994

ResellerViews Editors' Choice

AWARD-WINNING FEATURES

Instantaneous backup power beats blackouts and brownouts

Unmatched lightning (tested to UL1449) and surge protection for maximum hardware safety

Network-grade line conditioning and EMI/RFI filters prevent glitches

LAN Interface (on Back-UPS 400 and up) provides automatic shutdown to all major OS: Windows, NT, NetWare, LAN Server, LAN Manager, LANtastic, Unix, OS/2, Vines, AppleShare/System7 and more.

Site diagnostics automatically spot missing ground and reversed polarity, two common wiring faults that usually require an electrician to diagnose.

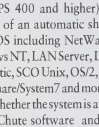
...ow you to customize ...alarm settings.

...ing peace of mind.

...full safety approvals

...uipment Protection

...r Replaceable Batteries ...costs by allowing safe ...ment of exhausted ...system stays running.



Free Power Solutions Handbook

What are the myths and musts of PC protection? What are the 10 most common power protection mistakes? The top tips for adding reliability to your LAN? Get your FREE copy and find out!

☐ **YES!** I'm interested in trading up a competitive or older UPS to a Back-UPS. Please send Trade-UPS info.

☐ **No!** But I would like a FREE Handbook.

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Company _____

Street/City/State _____

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Phone/fax: _____

Brands of UPS used? _____ # servers/PCs to be protected? _____

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Starting at
$119

There are three types of computer users: those who have lost data due to a power problem, those who are going to, and those who have protected themselves against the inevitable surge, blackout or brownout with the most reliable UPS they can buy: Back-UPS by APC. In fact, editors and users alike agree that if your system demands absolute reliability, you can depend on APC Back-UPS.

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APC Voted most reliable by 3-to-1
Tripp
Best

PC MAGAZINE

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PC MAGAZINE UK EDITORS' CHOICE

"The clear winner in price performance...it's unbeatable..."

August 1993
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Back-UPS® prevail

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And since data processed on networked clients needs protection too, the $139 Back-UPS 280 provides an economical solution for all your LAN workstations. And if you have a new green PC, the price is even better at $119 for the new Back-UPS 200.

MADE IN

Discovering how essential Back-UPS protection is can be hard...if you wait for the next storm to roll through. But discovering how affordable it has become is easy...

Call today and find out (the easy way) why more than 2,000,000 satisfied users bank on Back-UPS from APC. With more awards than all other brands combined, field-proven reliability, and a two year warranty, Back-UPS are power protection you can purchase with confidence.

Back-UPS (L to R)	Application	Sugg. List
200	Green PCs, small desktop systems	$119
280	Desktop systems, LAN nodes, POS	$139
400	Desktop 486, 386 systems, servers	$199
450	Tower 486, 386 systems, servers	$254
600	Heavily configured systems, CAD/CAM workstations	$359
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1250	Multiple systems, LAN hubs, small minis, telecom equipment	$689

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PC World Top 20 Upgrade

Windows Mag. Readers' Choice

LAN TIMES READERS' CHOICE 1994

PC Week ReaderViews Editor's Choice

yes NETWARE Tested and Approved

MICROSOFT WINDOWS COMPATIBLE Approved

CABLETRON LANtastic

SCO Unix

and Santa Cruz Operation

SCO OPEN DESKTOP

Novell

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Site diagnostics automatically spot missing ground and reversed polarity, two common miswirings which usually require an electrician's visit to diagnose.

Option switches allow you to customize transfer voltage and alarm settings.

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Dept. E7

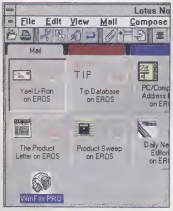
Circle 116 on reader service card.

Fax to the Max

Nobody can doubt that faxing is central to business. But there's faxing and then there's power faxing, which can be among your most important business weapons. Information management can't be overused, and power faxing is all about managing your information. The standard fax machine is useful, but a network of PCs stocked with fax boards, OCR software, and fax-management software is a juggernaut. Once everything's in place, information can emerge as the real secret weapon.

THE PROBLEM: *Faxing can expedite your work, but if you have limited line space, voice telephone calls have to take priority.*

THE SOLUTION: There's nothing more annoying than calling a telephone number and hearing that screeching fax noise. So do your clients a favor: Get a fax board that distinguishes between incoming data and voice calls, or invest in a separate phone line for each if it's important that faxes don't cut into telephone time. Furthermore, consider fax boards that offer you complete background faxing (the $199 Intel SatisFaxion is one of the best of these). If you don't have background faxing, the PC slows to a crawl every time a fax is being received, which results in lost productivity.

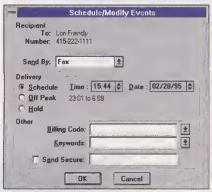


Background Faxing: Keep working while your system sends faxes. Here, Intel's SatisFaxion and Delrina's WinFax Pro go to work.

You might also consider a software solution that features *both* fax/voice detection and background faxing. GFI Fax & Voice's FaxMaker can handle this task for less than $300.

THE PROBLEM: *You've got a lot of purchases clamoring for your budget. How do you deploy power faxing without breaking the bank?*

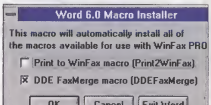
THE SOLUTION: You don't need a fax board for every computer. PCs on a LAN can share fax boards, and most networking software makes this possible. Shared fax boards are better than shared fax machines, because networked fax boards can queue faxes automatically for transmission as soon as the line is free, and nobody has to stand around waiting. Many fax software programs offer scheduling as well. Some good contenders include Delrina's WinFax Pro and Global Village Communication's Faxworks Pro. Using one of these products, faxes can be scheduled to be sent from PCs at convenient or less expensive times. For large numbers of users, consider a fax server, which tracks all activity for costs and use. You might also want to consider using a network printer with fax capabilities such as Digital Equipment's DEClaser 3500 fax card, which lets the laser printer receive and print out high-quality faxes on plain paper. Also, Toshiba's TF505 is a full-featured laser-quality fax machine that can double as a regular laser printer for a PC or small LAN.



Share Fax Boards: Save money by sharing networked fax boards, and use fax software that lets you schedule transmissions at off-peak hours.

THE PROBLEM: *Training users to fax directly from their computers is time-consuming. And the time they spend sending faxes from within various Windows applications costs money.*

THE SOLUTION: Buy fax software that automatically installs a fax command in your most important applications, or at the very least have fax commands custom-programmed. Here's an added bonus: You avoid the possibility of an employee forgetting to select the laser printer for the next real print job, and faxing a sensitive document to someone who shouldn't see it. Choosing fax software that has a truly usable interface makes a difference, especially when you need to fax information from a variety



Fax from Your Apps: Some fax software, such as WinFax Pro, can install a fax command in the applications you use most often.

Man's best friend
- retrieves
- comforts
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Businessman's best friend
- scans
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New ScanMan **PowerPage**® from Logitech™ is a scanner, fax machine and copier in one — all for less than the cost of a flatbed scanner! Use it with your fax modem and it acts as a fax machine, accepting hard copies like a fax machine would...connect it with your laser printer, and it works just like a copier. As a scanner, it handles full, small and odd-sized pages. Unsnap the top, and you can even scan bound materials. *And* because it's boardless, there are no installation problems — simply plug it into the parallel port on your desktop or portable computer. To get product information by fax, call **1-800-245-0000** and request document # 4012.

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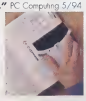
"...THE EASE WITH WHICH THE POWERPAGE FAXES, PHOTOCOPIES, DOES OCR, AND GRABS GRAPHICS IS UNPARALLELED." PC Computing 5/94

Whether you need a color, black-white, or boardless handheld scanner, Logitech has the right scanner for you. And with OmniPage®, Direct AmyFont®, OCR, Freetouch, and AutoStitch, Logitech scanners have the features you'll need.



LOGITECH

The Senseware™ Company

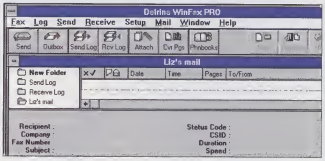
Circle 156 on reader service card.

Power Faxing: Fast, Easy Document Transfer

of source applications. With Watermark from Watermark Software, you can send faxes from within any application by linking them as OLE objects. DCA's CrossFax will append faxes to each other, to save time.

THE PROBLEM: *What about all your remote users? Can they be power faxers?*

THE SOLUTION: Fax management is difficult enough in the office, but from the road it's a nightmare. Fortunately, Delrina's WinFax Pro offers remote fax retrieval and, at the same time, remote e-mail management. The product, available on the street for $120, also offers rental fax mailboxes and other extremely useful features, and is a must for power faxers until the other packages catch up. Remote users can also set up their own fax-on-demand systems to handle fax requests while they're out of the office. Products such as FaxMaker from GFI Fax & Voice can streamline call-in fax responses, and permit fax requests to be forwarded or fielded from a remote location.



Remote Faxing: Power users who want to rev up remote fax capabilities should look for a package that combines remote fax retrieval and e-mail management. WinFax Pro offers both.

NEIL RANDALL *is the author of* Teach Yourself the Internet: Around the World in 21 Days. *He can be reached on the Internet at nrandall@hookup.net, or on CompuServe at 73637,1733.*

Quick Takes: Leveraging Your Fax Power

1. **Don't waste time standing by a fax machine**—rig one inside your PC and let 'er rip. With background faxing, you can do other things while your fax is being sent. The time you save will pay for the fax board faster than you can hit the Send button.
2. **You can set up fax-on-demand telephone systems,** forward faxes to be received in remote locations, and send them to one or many recipients from on the road just as easily as you can from your home.
3. **Tired of deciphering low-quality fax printouts?** Consider employing a hybrid fax device as part of your office technology. Fax machines that double as printers—and printers with fax cards built in—can now spit out laser-quality faxes on plain paper.

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$110
Reader Service No. 771

DECfaxer 3500
Digital Equipment
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$2,009
Reader Service No. 772

FaxWorks Pro
Global Village Communication
(800) 432-9967
$129 (single user)
Reader Service No. 773

FaxMaker
GFI Fax & Voice
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$195 (5 users)
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Toshiba America
Information Systems
(800) 468-6744
$2,159
Reader Service No. 776

Watermark
Watermark Software
(617) 229-2600
$129
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WinFax Pro
Delrina
(800) 268-6082
$79
Reader Service No. 778

Keep on Faxin': Power faxing never looked so good. Whether you're sending multiple faxes from your PC on a dedicated fax board, sharing a fax board on a network, or using remote fax-management software, you can do it faster, cheaper, and more easily than ever. These products will pay for themselves fast by saving time.

WEAPON YOUR BEST **FAX** FORWARD

1 Choose the task you want to accomplish.
2 Select the factor that defines your work.
3 The most mission-critical technology solution is .

Background Faxing	PC in Moderate Use	Normal Fax Board
	PC in Heavy Use	Fax Board with Processor
Network Faxing	10 or Fewer PC Users	Shared Fax Board
	More than 10 PC Users	Network Fax Server
Fax Management	User in Office	Fax/OCR Software
	Remote User	Fax/Remote Software

INTRODUCING

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Circle 159 on reader service card.

Aim to **Win** Your Battle

Strategic business maneuvers take time and thought. Surely there are some instant advantages to be gained, some ways of putting the battlefield in order while you marshal your troops and prepare for the sweeping pincer movements represented by the five categories discussed on the preceding pages. What you need is something that shoots through the clutter, that puts your people in touch with their real potential. What you need, in other words, are bullets that work magic.

Don't Leave Work without Them

Score Greater Productivity with Little Cost

Problem	Product & Solution	Vital Statistics
You need customizable hourly time billing.	**TimeSheet Professional 3.0 for Windows** Software that does time billing and more, including the means for useful data export.	Timeslips (800) 285-0999; $199, $699 for 8 users *Reader Service No. 780*
You need to collect, organize, and map demographic information.	**First St.** This package offers sophisticated help at a commensurate price.	ESRI (and Wessex) (800) 447-9778; $1,999 *Reader Service No. 781*
Checking e-mail messages on a half-dozen services is time-consuming.	**E-Mail Connection** It will even comparison-shop online prices of each service to help you save on fees.	ConnectSoft (800) 234-9497; $50 *Reader Service No. 782*
Windows software is a breeze to install, but a nightmare to remove.	**UnInstaller 2.0** Immensely helpful for removing software applications. Offers better speed and more disk space in the process.	MicroHelp (800) 922-3383; $45 *Reader Service No. 783*
Your employees need guidance and leadership. You want them to get their work done well.	**ManagePro 2.1** An employee-management tool with built-in project and information management that focuses on making you a better people manager.	Avantos Performance Systems (800) 282-6867; $199 *Reader Service No. 784*
You need portable CD-ROM-capable tools for creating multimedia presentations.	**Panasonic CF-41** Portable yet fully equipped, this CD-ROM notebook is well worth the cost. (See "Multimedia in an Overnight Bag," page 59.)	Panasonic (800) 742-8086; $6,000-$9,000 *Reader Service No. 785*
Have computer, will travel. It must be so light you hardly notice it, yet up to your mobile workload.	**HP OmniBook 600PC** It stores your apps in ROM, so it's superfast. It weighs in at 3.8 pounds, and fits comfortably on the airplane tray table.	Hewlett-Packard (800) 443-1254; $2,800 *Reader Service No. 786*
Your text isn't just memos, it's laid-out copy. You need a unique look for each document.	**ClickBook** Instead of just printing files, design portable, highly usable documents of any type. Great for preparing specialized pamphlets and booklets.	BookMaker (800) 766-8531; $65 *Reader Service No. 787*
You're constantly having to produce flowcharts, graphics, and decision trees.	**Visio 3.0** Still the reigning champ thanks to its being quick, easy, and effective. Use Visio Express for Microsoft Office.	Shapeware (800) 446-3335; $145 *Reader Service No. 788*
You need to store, organize, and access your myriad brainstorming ideas.	**Inspiration 4.0 for Windows** This combination outliner and thought processor works in graphics and text modes, with good automation.	Inspiration Software (800) 877-4292; $129 *Reader Service No. 789*

Problem	Product & Solution	Vital Statistics
You have to run Windows on a Mac. Are you a hopeless believer or just plain nuts?	**SoftWindows 1.0** Even on a Power Mac, Windows is slower than on a fast 486. But with SoftWindows, at least you can run it.	Insignia Solutions (800) 848-7677; $299 *Reader Service No. 790*
Your 386 is too slow. But you won't see a 486 until after the New Year.	**Cx486SRx2** Get the performance of a 486 with this easy-to-install snap-in chip. It's a cheap, quick performance boost.	Cyrix (800) 327-6284; $219 *Reader Service No. 791*
You want collaboration, teamwork, and groupwide sharing. How to do it cheap?	**Collabra Share** If collaboration is all about lively, constant discussions among workers, Collabra Share leads the way.	Collabra Software (800) 474-7427 $75 per user *Reader Service No. 792*
You want the means and the security to use the Internet to its fullest.	**Netscape** Here's security and mobility all in one: Even the free shareware version of Netscape is a great World Wide Web browser.	Netscape Communications (800) 638-7483; Free *Reader Service No. 793*
You want a front-end organizational tool to manage everything.	**Ecco Professional 2.0** Much hyped, and hard to learn, but still the most useful PIM on the market, especially for rich, complete organization.	NetManage (800) 457-4243; $180 *Reader Service No. 794*
You're determined to save time on the Internet. How can you be more nimble in your online work?	**Internet in a Box** Spry's collection of Internet tools was among the first and best of what will soon be a crowded genre. Includes a licensed Mosaic.	Spry (800) 777-9638; $79 *Reader Service No. 795*
You need fast data communication with your customers.	**Courier V.Everything with V.34** Among the first of the PC Card V.34 fax-modems, the Courier offers 28.8Kbps speed and easy upgradability.	U.S. Robotics (800) 877-2677; $399 *Reader Service No. 796*
You need a backup tape drive to save your work, but you wish it could do other work, too.	**TapeDisk** Install this utility and watch your tape drive become another hard drive, as well as a backup tool.	TapeDisk (715) 235-3388; $249 *Reader Service No. 797*
You frequently send large files back to the office from the road. But transmission is too slow.	**WinZip 5.0b** You need a good compression program. WinZip is much, much easier than good old PKzip, and it's only $30.	Nico Mak Computing (800) 242-4775; $30 *Reader Service No. 798*
You've got too much paper and no time to file it. The result? Nothing is accessible when you need it.	**PaperMax and MaxMate** This document-management package gives you all you need for moderate-sized jobs, at as low as $350 and without the annoyance of add-in cards.	Visioneer Communications (800) 787-7007 $350 *Reader Service No. 799*
Your notebook computer can do everything except print out the files you need on the road.	**NoteJet II 486C** The NoteJet combines notebook computer and ink jet printer, all in one convenient package.	Canon Computer Systems (800) 848-4123; $2,600 *Reader Service No. 800*
Straight text isn't enough. You want rich, searchable documents with chapters and linked tangents of information.	**Folio Views 3.1 IPK for Windows** Folio Corp. calls this program an infobase package, and they're right. Once you've learned it, you can create complex documents with hypertext links.	Folio (800) 543-6546 $895, plus $295 per user *Reader Service No. 801*
Sharing laid-out documents with colleagues? What if they don't have all the right fonts installed?	**Font Works** Lets you see documents as they were designed by creating fonts on the fly for those you don't have installed.	ElseWare (800) 357-3927; $79 *Reader Service No. 802*
You want to communicate with colleagues who are set up in a hotel for a week-long conference.	**EtherWave AUI Transceiver** A quick, easy, and inexpensive way to get a portable network up and running. You can even link directly to a hub.	Farallon Computing (510) 814-5000; $130 *Reader Service No. 803*
You're making your own CD-ROMs now. How do you access the stored information?	**DRM-1804X CD-ROM Changer** This machine lets you keep up to 18 CDs on tap at all times, albeit without simultaneous access by multiple users.	Pioneer New Media (800) 444-6784; $2,000 *Reader Service No. 804*

The War **Behind** the Lines

You followed our tips. You got the fastest hardware, the friendliest software, and all the secret weapons that made sense to you. But still your sales are down and productivity is not what it should be. There's only one thing to do. Attack the competition where it hurts. Attack from within. After all, this is war. War is hell, but so is losing money.

You could do what I did. Visit the clandestine headquarters of the supersecret NIS (Nothing Is Sacred). The man identified himself as a "Zard" and put his nose right up to mine.

"You're a failure."

"Why?"

"Because you surround yourself with hacks, who, like yourself, can't stay focused."

I wasn't going to argue.

"Focus is everything. The reverse is applicable for your competition. And that's the premise our business is based on. The more we can get them interested in nonbusiness-related material, the less time they have to work."

Screen savers that **MESMERIZE,** *mice gizmos that* **EXPLODE** *on touch, trackballs that can emit* **ELECTROSHOCK,** *and e-mail that* **TITILLATES . . .**

We walked to a wall of computers. With one keystroke the monitor in front of me began to display a screen saver of incredible detail and beauty. I saw prismatic colors moving in ornate kaleidoscopic patterns accompanied by hypnotic music. I was mesmerized.

"Productivity goes down 35 percent when this program is installed. Of course, it begins innocently enough with flying appliances, cute talking animals, but in a week or two the real stuff begins."

I could hardly hear what he was saying. I was hooked. I couldn't take my eyes off the screen. He flipped a switch and the screen went blank.

"I'll take one," I said. "What else have you got?"

We moved to another monitor. He flicked it on.

"This one is called the Cypher. Lots of businesses are using encryption codes to protect secret documents. The engine behind this baby scans the document for keywords, then reforms them as opposites. Simple changes can wreak havoc with interoffice memos. Even though we play dirty, we do have some ethics. We work under a strict 'no virus' code. At no time is anyone's information ever destroyed, only temporarily altered."

Then we walked into a room where men wearing protective uniforms were testing exploding mice and electroshock track balls. "That's our next generation of products. It's not for the squeamish," he said.

The next room was filled with printers churning out beautiful graphics. "This is our latest. We call it the chameleon. Graphics and charts are big business these days. This puppy produces normal-looking graphics, but after five hours at room temperature the colors transform to the gaudiest pigments available. Here's a page printed a few hours ago. It's just about to change."

The picture was of a handsome CEO in a smart three-piece navy blue suit, holding a futuristic-looking notebook computer. Before my eyes the colors changed. His suit went from navy blue to clown yellow with pink and orange polka dots. His portable went from a slate gray to puce with vomit green stripes.

"Pretty nifty, eh?" my host said.

"Pretty hideous," I said. "I'll take it. Anything else?"

"There's one more thing you might be interested in."

We entered a room with naked men and women on the phone, busily typing at keyboards. "Nothing throws people off like dirty e-mail and nude video conferencing," he said.

As I looked on, these operatives plied their lascivious craft, making all manner of nasty suggestions in whispered voices to long-distance managerial targets.

"This seems to hit below the belt," I said

"What are you worried about?" he said. "This is war."

CHARLES FLEISCHER *is a comedian who once used virtual reality to join the French Resistance.*

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Circle 239 on reader service card.

A Movable Desktop

SYNOPSIS

MUSCLE IN MOTION: *Worried about giving up power and features? Don't be. Almost everything you can get in a desktop can be found in a notebook.* **192**

MULLING OVER MOBILITY: *Gaining freedom from your desk with a notebook is easier than you think.* **194**

NOTES FROM THE FIELD: *Five of our readers take notebooks for a test drive and report back with the pros and cons.* **196**

FINAL ANALYSIS: *Should you replace or complement your desktop? Here are the answers.* **202**

It's 6 p.m., time once again for the notebook shuffle: transfer the files from your desktop PC to your notebook so you can get out of the office at a decent hour and finish up some work at home. You've gathered everything you need to prepare for tomorrow's presentation, but as the elevator descends, you can't shake the sinking feeling that you're leaving something behind. Wouldn't it be simpler to just replace your desktop PC with a notebook?

This scenario doesn't imply the trade-off that it once did. Improvements in screens, keyboards, processor power, and integration have eliminated some—but not all—of the compromises inherent in notebooks. What's the key to making your notebook a desktop replacement? Create a way station for it when you're at your desk. You can either get a docking station to encompass drive bays, network cards, and other permanent connections, or a port replicator that lets you plug in a full-sized keyboard and monitor. Newer docking stations work like VCRs: When you're ready to go, press eject and out comes the notebook. When you return, just slide it back in. With a port replicator, plugging in to the external world is just as easy—no need to update files on two systems ever again.

Still worried about compromising portability or expansion potential? Fear not. We cover the issues crucial to determining whether your notebook—or any notebook yet designed—can fully replace your desktop system: features, power, and mobility.

To see if a notebook can cut the mustard as a desktop replacement, we turned to the most discriminating judges of all. Five *PC Computing* readers temporarily gave their desktops the boot and tackled the world of notebook computing. We'll share their thoughts with you. And to see how a slew of notebooks fared in performance and durability tests as candidates for top desktop replacement, see "Notebook Hell" in our January issue (page 124).

BY LIESL LA GRANGE

A COMPLEMENT: A PDA such as Sony's Magic Link can complement your desktop by keeping you wired while you're on the road. But it can't replace your desktop altogether unless your needs are light.

B DOCK: Paired with a port replicator, Toshiba's Portégé T3600CT subnotebook will keep you plugged in to all the amenities of the external world.

C REPLACE: Frequent fliers can work anywhere with the help of a lightweight subnotebook such as Hewlett-Packard's OmniBook 600.

PHOTOGRAPHS BY ED KASHI

No Limitations: Need a system that can keep up with your fast-paced

lifestyle? Replace or complement your desktop with a portable system.

Potency: Enough Features and Power to Get the Job Done?

Muscle in Motion

If you think replacing your desktop PC with a notebook means giving up features or power, think again. Consider the increased performance of today's notebooks plus the convenience of a docking station for accessing a network, a printer, and an external keyboard, monitor, mouse, and CD-ROM drive. You'll never miss your desktop—that is, unless you're on the road all the time and don't have one now. In short, there's no need to sacrifice power or being plugged in to the office for mobility.

If you crave speed, no problem. Take your pick of fast 486- and Pentium-based notebooks with local-bus video and PCI peripheral capabilities. Video can be slightly slower on notebooks, but for most people it's as much or more than they'll ever need.

The sky's the limit in terms of memory and hard drives, too. Just six months ago, the largest hard drive you could get for a notebook was 300MB. Now 800MB drives are available, and before long you'll see notebooks with 1GB of storage. As with desktops, you should choose a notebook that accommodates easy hard-drive upgrades. As for memory, however, plan ahead for what you'll need in the future. You can get the same amount of RAM as in a desktop, but it's not as economical to upgrade because you usually have to throw out the old SIMM chips and replace them with a new set.

If you're on the road a lot, need extra storage, and don't have access to a network drive, removable hard drives are a great alternative. When one becomes full, simply swap it out for another. Better yet, a modem in conjunction with remote-control software can give you access to your network from anywhere.

The beauty of a notebook as a desktop replacement lies in expandability, either through a port replicator or a docking station. Both let you work at your desk as you normally would on a desktop PC—plugged in to a full-sized monitor, keyboard, and standard mouse. There's no need to go through the hassle of unplugging all of your external devices when you want to go mobile, and then rid your desk of the tangled mess of cables. When you need to take work home or move on to another site, just slide out the notebook and go. With a docking station, you can even add a tape drive for backups or a built-in CD-ROM drive.

Port replicators lack the capability that docking stations have to accommodate cards and drive bays, but they're less expensive and lighter, and they still let you make all of your basic connections. If you do most of your traveling from campus to campus, or simply bring work home from the office, you can easily take a port replicator with you—or have one waiting at each site.

While a docking station is more expensive than a port replicator, it adds much more functionality and features. The so-called "hot docking" feature lets you connect and disconnect a notebook with one touch, and it takes care of reconfiguring monitor resolution and other settings. You don't even have to shut off the power. The notebook automatically adapts from running off the battery to running off the docking station's connections and vice versa. With extra slots and bays, docking stations can beef up any portable. And there's no need to change the way you normally work—except that you get the added freedom of mobility.

GRAB AND GO: The IBM ThinkPad's Dock II put the *hot* in hot-docking. The sleek, sturdy docking station provides extra expansion with multiple slots and bays, plus built-in speakers and a CD-ROM drive. And the Dock II, like other docking stations, locks your notebook down for security.

PCI POWER: Weighing in at 6.5 pounds, Texas Instruments' TravelMate 5000 offers 8MB of RAM (expandable to 32MB), an 810MB hard drive, a dual lithium-ion battery pack, a 10.4-inch active-matrix screen, an internal 16-bit sound card, built-in speakers, and a Type III PC Card slot.

PHOTOGRAPHS BY FIELD STUDIOS

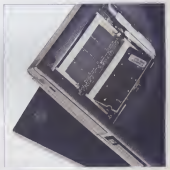
Determine whether you need all the expansion of a **docking station** or whether a **port replicator** will do. Either way, it should be as simple as popping a video cassette into your VCR. And with a docking station, look for one-touch plug-in, or "hot docking."

If you'll be spending most of your time working plugged in to an external monitor, **screen quality** may not be a primary concern, which means you won't have to purchase a high-quality active-matrix screen. Go for a dual-scan screen instead and put the money you've saved toward a faster processor or more memory.

In and Out: Thanks to port replicators and docking stations, you can be connected and reconnected to external peripherals instantly.

Almost all major notebook vendors offer **upgrades** for drives and RAM so you can add storage space and memory to your heart's content. However, plan ahead for what you'll need in terms of memory: You can't simply add more RAM to what you already have. You have to throw out your old SIMMs and install a whole new set.

Screen Savings: Does your portable stay docked more often than it's on the road? Opt for a considerably less expensive dual-scan screen rather than active-matrix.



Quick Change: Want to upgrade to more memory? Remove your notebook's old SIMM and snap in a larger module.

MOBILE MULTIMEDIA MAGIC: No need to skimp on multimedia when you take presentations on the road with Panasonic's CF-V41. This clever notebook stows a full-sized CD-ROM drive under the keyboard to add spice to your presentations without adding extra bulk.

EXTRA EXPANDABILITY EVERYWHERE: Port replicators such as Toshiba's T3600CT's are so light and inexpensive that you can carry them with you or keep extras stored at the sites you visit most frequently. In other words, no more hassles with plugging and unplugging external peripherals.

On the Road: Can They Take You Where You Want to Go?

Mulling Over Mobility

Notebooks give you the freedom to work anywhere and anytime you want. There's no argument about the increase in productivity. But as the saying goes, there's no such thing as a free lunch. Users want their notebooks to be smaller, faster, lighter, and cheaper—never mind that these traits are often mutually exclusive. Fortunately, notebook manufacturers keep chipping away to give more for less.

A faster processor needs a bigger battery, which means extra weight. But there are ways to get around this. For example, on many notebooks you can swap out the floppy drive for an extra battery. And new dual lithium-ion batteries last almost twice as long as nickel-cadmium batteries.

Just as a faster processor needs a bigger battery, so does a bigger screen. But if your notebook is your mobile amigo on long layovers and poorly lit airplanes, you don't want to skimp by going with a smaller color screen. A large, high-quality screen may add to the system's weight and cost, but in the long run your eyes will thank you.

Another sacrifice for mobility is keyboard size. Notebook keyboards are laid out differently from desktop keyboards and lack the standard numeric keypad and function keys. In addition, the individual keys on portables are closer together. You'll probably make more typing errors at first, but if the notebook is your sole machine and you travel with it frequently, you'll soon adapt to the differences.

More good news about mobility: Items you previously had to drag along with you to increase usability are now integrated into the unit. Besides the room to stow extra batteries, it's common for the current crop of notebooks to have integrated modems, pointing devices, even AC adapters.

As notebooks become less of a trade-off, they become more popular—not just with businesspeople, but with those who prey on businesspeople, too. It's easy to slide an unattended notebook under your arm and amble away without attracting attention. You can insure your notebook for replacement value, but what about the data? If it's lifted while you're on your way to give a sales presentation in Tokyo, you're out of luck. You can't replace weeks of work on a layover, and you don't want confidential information getting into the wrong hands.

Notebook manufacturers are now designing computers with these security concerns in mind. With a removable hard drive, for example, you can slide out your valuable data and take it with you or lock it up. If the type of work you do is confidential, look for this feature. Similarly, SyQuest manufactures removable PC Card hard drives—you leave the drive mechanism in the PC Card slot and take only the data with you. And for even more security, Texas Instruments has added a special metal loop to its notebooks so you can lock them to something secure the same way you would lock up a bicycle.

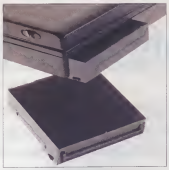
But there's one area where significant progress has yet to be made, and that's durability. In last month's durability tests for "Notebook Hell" (page 124), only a few notebooks survived our drop and spill tests. Vendors are building notebooks with stronger plastics for solid, dust-proof casings, but you'll still want to treat them the same way you treat any piece of sophisticated electronics equipment—carefully.

POWER-MANAGEMENT PEEK: The small LCD screen in the upper-left corner of AT&T's Globalyst 250 displays symbols for battery life and disk-drive access. You can check your battery's charge level and floppy- or hard-drive access at a glance, without having to launch software.

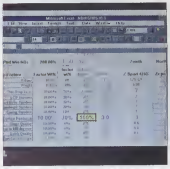
COLOR EXPLOSION: IBM's ThinkPad 755C sports a gorgeous 10.4-inch active-matrix color screen. The sharp color may just make you forget your desktop monitor altogether. And because of its clarity, it's great for giving multimedia presentations to small groups of people.

To get the most from a notebook's **battery life,** look for a system that lets you swap out the floppy drive for an extra battery. The life of each battery varies depending on the notebook and the type of work you're doing, but don't settle for less than 3 hours with a recharge time of 30 to 40 minutes.

Because color is key to navigating in Windows applications, a monochrome screen just won't cut it. **Onscreen color** should be as sharp as it is on your desktop monitor. Dual-scan color will usually suffice for most uses, unless you want to give presentations to small groups directly from the notebook's screen. If that's the case, you'll want an active-matrix display. As for size, don't settle for less than a 9.5-inch screen. Although they are getting more durable, notebooks take more abuse than desktop PCs. When choosing your machine, pick a vendor that offers **field service,** which means the company will dispatch someone to your hotel or work site to make repairs or give you a loaner unit if necessary. And with a removable hard drive, you can keep your data with you.



On the Safe Side: Want to ensure you'll have enough juice on the road? Remove the floppy drive and store an extra battery.

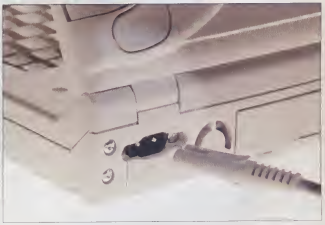


Screen Saver: If you're a road warrior, you should opt for a high-quality color screen—it's easier on your eyes in the long run.

Data Save: Just because your notebook is crippled is no reason for you to be. If it has to go in for repairs, just slip out the hard drive.

ERGONOMIC AID: Dell fashioned a wrist rest in front of the Latitude XP keyboard for added comfort while you're working in cramped areas such as planes, trains, or buses. Just because you're forced to take your job on the road (or in the air), that's no reason to be uncomfortable.

HIDEOUT: Compaq's LTE Elite provides aid to weary travelers by eliminating the need for you to carry around an external power cord. With its integrated AC adapter, you can plug directly from the notebook to the wall socket. You get electrified without the extra weight or hassles.



Notes from the Field

Who better to determine the merits of a notebook as a desktop replacement than the readers of *PC Computing?* We chose five San Francisco Bay Area subscribers who had never used notebooks before to act as subjects in our experiment. Four readers were given Dell's Latitude XP 4100 CX, and the other reader was given AT&T's Globalyst 250. These are solid all-around notebooks with comparable features and performance. We then asked our subjects to keep a log of their impressions. Here's what they had to say about docking stations, fax modem connectors, AC adapters, small keyboards, and more.

ROADWORTHY AND READY

Transportable Work Tool

Computer consultant Barbara Seal normally spends the majority of her day in clients' offices. The notebook allowed her to transport her system's files everywhere she went—a huge benefit because the items she needed were right at her fingertips. It let her create and download files directly to her clients' computers, which was not possible before. Work that usually had to wait until she returned to her office at the end of the day could be taken care of immediately.

Seal loved the active-matrix color display and removable disk drive, and found the battery life and recharging time to be better than she expected. The only bad experience she encountered with the notebook related to its trackball. Seal mastered the layout of the keyboard in no time, but the trackball was a thorn in her side. Even after adjusting the trackball's settings through the included software, she still felt like she was constantly fighting with it. This made moving around Windows applications difficult for her. Except for this problem, she believed that the notebook made a handy travel tool overall, one that enhanced her productivity and let her get more work done while out of the office.

PRO: Faxing orders as she thought of them instead of back at the office.
CON: The trackball.

LOGBOOK

"The trackball is a bit of a coordination challenge. We'll see as time passes."

"Connecting the Trakker cable and running the restore process was a piece of cake!"

QUALITY COMPUTING

Work Everywhere

Ron Cheechov's job as a quality assurance assistant doesn't require him to travel enough to justify replacing his desktop PC with a notebook, but he greatly enjoyed the flexibility a notebook granted him. The keyboard was quiet enough for him to take notes in meetings without disturbing others. The notebook's compact size was another benefit. When Cheechov wasn't using his computer, he could tuck it neatly into a desk drawer, which gave him more room to work on his desk. It was also a handy way to secure the unit from theft when it wasn't in use.

The PC Card fax modem was easier to install and use than the desktop variety, but the modem's connector was a bit of a pain to carry around. Other than that, using the notebook for communications was easy.

The smaller screen on the notebook took a bit of adjustment for Cheechov, but he found the resolution and color quality comparable to, if not better than, his full-sized monitor. The only time Cheechov regretted the size of his notebook's screen was when he used QuarkXPress, but when that was necessary, plugging in his external monitor was a snap—ditto for the external keyboard, mouse, and printer.

PRO: The flexibility to work anywhere, anytime.
CON: Delays in operation when switching apps.

LOGBOOK

"I tried to use keystrokes more often and took the time to learn keyboard shortcuts so I wouldn't have to use the trackball as much. I started working faster once I got past the learning curve."

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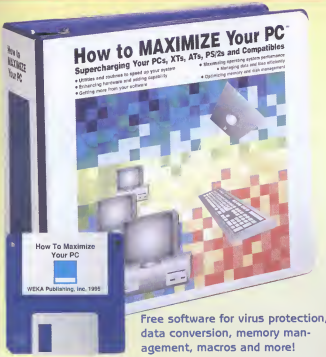

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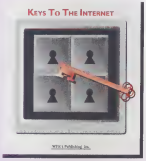

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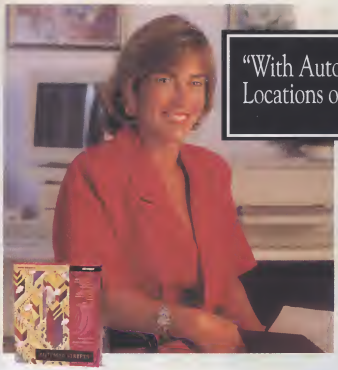

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COMPUTER COMMUTER

Dominant Docking Station

Doing his part for the environment, Technical Support Engineer Bill Nelson commutes to his office daily by train and bus—a lot of travel time. AT&T's Globalyst 250 was extremely useful in making this time more productive. While he was able to get a lot accomplished working on the train, the narrow seats were a bit cramped, and he developed a kink in his neck and an ache in his mouse thumb. Because of the way the train vibrated, Nelson experienced difficulty doing certain functions accurately, such as cutting, pasting, and highlighting.

Because of limited workspace in Nelson's office, a docking station is not a viable option for expansion. It simply takes up too much room, and a bookshelf overhead makes placing his regular monitor atop the docking station impossible. The only space to put the monitor is alongside the keyboard, which makes viewing it uncomfortable. A port replicator could be an alternative because it takes up much less space, but his desk would still be cramped.

PRO: Screen quality and system speed.
CON: Placement of mouse and keyboard connections.

LOGBOOK

"Shortcut key combinations in some apps are difficult to use. What used to be a one-hand operation now requires two hands. The keys have a nice feel, though."

TOTABLE TRANSMISSIONS

Communication Kink

Bill Spengler, senior partner with a management and strategic marketing firm, uses his desktop PC for faxes, correspondence, proposals, project analyses, presentation preparation, and contact management. The notebook adequately handled most of his daily tasks and granted him the opportunity to complete work at home without having to transfer files between different systems.

However, two of the tasks Spengler executes on his desktop PC—overnight faxing and voice mail—gave him problems on the notebook. While there are digital signal processor cards available for notebooks that take care of voice mail, his desktop card couldn't be swapped into his notebook. And when he scheduled a group of faxes to go out overnight, the notebook's power-saving mode brought his faxing to a halt. The problems were fixable, but frustrating.

He found the notebook's keyboard quite good, but it was a bit inconvenient for him to use without a separate numeric keypad. For a true test of the notebook's worth, Spengler loaded Doom and gave the game a whirl. He discovered that the graphics were comparable to his desktop system, but he missed the background sound.

PRO: Working at home without having to compete with his wife for the PC.
CON: Small screen size.

LOGBOOK

"Docked to a standard monitor and keyboard, I have the best of both worlds."

"My old 25-pound 12MHz 386 laptop with dual-scan CGA LCD will be a letdown after this!"

DOWNTIME DESTROYER

Productive in Many Ways

While Richard Albright's job as a bank vice president and credit administrator didn't require any significant travel during his stint with the notebook, he expects that it would be a great way to increase productivity. He looks forward to his next trip so he can transform downtime in airports, airplanes, and hotel rooms into work sessions, and replace the bulky folders of reference data he usually carries with digital files he can access with the notebook.

But Albright's travel with our notebook consisted solely of commuting by train. Still, it let him execute tasks such as composing memos. And as long as the screen was shielded from prying eyes, he didn't see a risk in working with sensitive documents.

Coincidentally, Albright's company is looking for a disaster-recovery contingency plan. He felt the notebook would be a great way of ensuring that he had the necessary information at his fingertips in an emergency.

In the end, he saw more of a need for companies to purchase notebooks and loan them out to employees for trips rather than replace people's desktops. However, if his travel time were extensive, he'd pick the notebook over the desktop PC without hesitation.

PRO: Productivity boost during his daily commute.
CON: Trackball a bear to use with spreadsheets.

LOGBOOK

"Dropping it was an initial concern, but I believe the design of the unit would minimize that risk during a commute or plane trip."

"Boy, does this thing use power."

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Can-Do Portables

The bottom line is that portables enhance productivity by letting you work anywhere without the burden of transferring files back and forth. And they aren't just for frequent fliers—most workers spend only a small percentage of the day at their desks. They travel to and from different sites, move around the office, and spend a great deal of time commuting. Even if the only traveling you do is between your office and home, think of how much more you can accomplish by reading e-mail or working on spreadsheets or presentations in transit.

With faster processors, larger hard drives, more memory, and better communications, there's not much missing from today's notebooks. And with a docking station or port replicator, a notebook can work like any desktop setup. It can even have a built-in CD-ROM drive and speakers for multimedia on the road. If your job calls for heavy travel, your only sacrifice may be full-sized keyboard and screen—a trade-off for mobility, but a boost for productivity.

So, given the state of portable computers, is it practical to replace your desktop with a notebook computer? Based on our experience with top machines and input from our field testers, the answer is that many users can indeed go solo with one machine. What kind of machine? The marketplace used to be clearly defined with two clusters of portables: notebooks sporting nearly full-sized keyboards, fast CPUs, on-board floppy drives, large screens, and ample battery power; and subnotebooks that compromised on some or all of these features. Now it's between "no-compromise notebooks" that—with the addition of a few peripherals—can satisfy all your needs, and less-powerful "desktop complements" (or even PDAs or tablet-based devices) that offer mobility as an adjunct to your desktop PC.

Depending on the kind of work you do, you may be able to opt for a no-compromise notebook. If not, our recommendation is to purchase an inexpensive portable that doesn't aim to replace your desktop but complement it with the option of mobility.

DECISION MAKER

CHOOSE THE RIGHT **DESKTOP REPLACEMENT** FOR YOUR NEEDS

1 Where do you do your computing?	2 What sort of computing do you do?	3 What's most important to you?	4 Your best mobile solution is . . .
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		Mobility	Desktop Complement
	Six or More Applications	Features & Power	No-Compromise Notebook with Docking Station
		Mobility	Desktop Complement with Docking Station
Hotel or Remote Office	Light Word Processing & E-Mail	Features & Power	No-Compromise Notebook
		Mobility	Desktop Complement
	Six or More Applications	Features & Power	No-Compromise Notebook (Docking Dptional)
		Mobility	Desktop Complement (Docking Dptional)
In the Field	Light Word Processing & E-Mail	Features & Power	Desktop Complement
		Mobility	PDA or Tablet Computer
	Six or More Applications	Features & Power	No-Compromise Notebook
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Crossroads

Ink Jet vs. Laser Printers:

BY JOHN MONTGOMERY

Ink Jet: This technology uses electricity to vaporize liquid ink from one of four cartridges (cyan, magenta, yellow, and black), then spray it onto paper where it dries.

Pros

- You can purchase a good-quality color ink jet printer for under $500, and the consumables (cartridges and plain paper) are cheap.
- They make almost no noise as they print.

Cons

- It can take two minutes to print a simple page.
- A bit of water can smear a whole page.
- Top-notch output quality still requires special paper, driving up printing costs.

Verdict

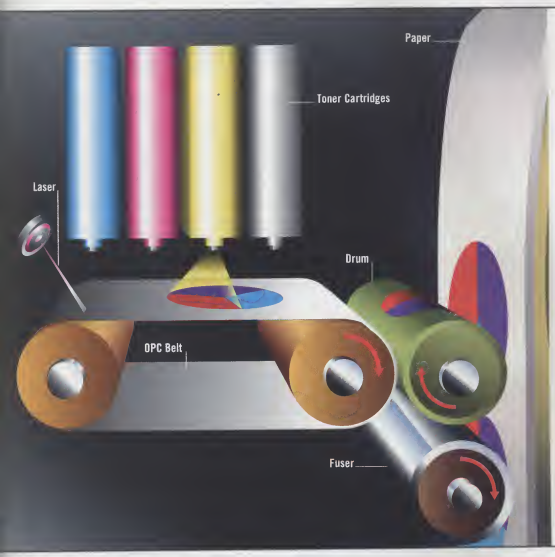
Color Laser: Ink jet printers will always have a place on desktops, but workgroups, and eventually individuals, will want the quality and speed of a color laser printer. A survey of computer industry insiders indicates that color laser will be the standard color printing solution in the future. Building on network printing technologies seen in most laser printers, color laser printers are ready to aid small workgroups. Meanwhile, there will always be a need for top-quality black-and-white output, where no other technology can touch laser. Once the technology has been around for a while, prices will drop and make color laser the standard.

The Buzz

Color Up: Color output will become increasingly important from mid-1995 on—spurred by Windows 95's and QuickDraw GX's built-in color-matching software and the natural decline in price over time. Analysts are in accord that the growth of printer shipments over the next two years will be driven by color—with monochrome printers accounting for just 40 percent of new printer shipments by 1998. Approximately 84 percent of the industry experts we polled believed that color laser printers would be the dominant print technology by 1996. The rest were confident that ink jet technology would prevail.

The High Road and the Low Road to Color

ILLUSTRATION BY TIMOTHY EDWARD DOWNS



Color Laser:

A laser beam takes four passes (one for each color) to render an image onto an organic photoconducting cartridge (OPC) belt, which picks up toner for one color on each pass. It then passes the toner to a drum that transfers it to paper where fusers melt it.

Pros

- You can get 8 pages per minute and up from a color laser printer.
- Of all the color technologies, color laser produces the best text.
- A color laser prints on plain paper.

Cons

- Expect to pay over $5,000 for a printer.
- Consumables are also pricey.

Timetable

YEAR 96 EXPECTED

Price Leads The Way: The biggest benefit of color laser printers is their ability to serve two needs with one machine—day-to-day black-and-white printing, and high-quality color output on plain paper. But color laser printers are expensive—very expensive. And until prices drop, people aren't going to rush out to put color laser printers on their networks.

Come 1996, we'll be seeing second- and third-generation laser printers from existing vendors. And look for more vendors to jump into the game. Quality will improve, prices will drop, and color laser printers will be as common as rainy days in Seattle.

Opinions

"Color LED printers—which are akin to color laser printers, but use a light-emitting diode instead of a laser—offer the highest resolution. But color ink jet will be the best-cost, highest-volume production solution."

DENNIS FLANAGAN, PRESIDENT AND CEO, OKIDATA

"Color lasers will come out on top, but ink jets will also be successful."

BARBARA NELSON, MAXTOR

"Color lasers will succeed over time, as costs and prices come down."

JOHN MURPHY, PRESIDENT, PRACTICAL PERIPHERALS

Help: Working Smarter

Untangle the Web with Mosaic

The Internet is chaos in action. Bringing order to the chaos has been the goal of several Internet projects including Gopher, Archie, and Veronica. The most interesting project right now is the World Wide Web, which uses hypertext- and image-filled rich-text–format documents to guide you through vast amounts of information. And the most popular way to navigate the World Wide Web is with Mosaic.

If that sounds too good to be true, it is. Mosaic can be difficult to get running. But it doesn't have to be. Here are simple, step-by-step instructions for getting your PC and modem talking to the Internet with Mosaic. In addition to these instructions, you'll find several zipped archives on PC Contact that contain everything you need to get started. (See "Mosaic Toolbox" page 214 for details.)

First, a Warning This article is for Windows users with modems. If you have an Internet connection through a local area network, know that your setup is a stallion of a slightly alternate hue. See your systems administrator for details.

To get started, of course, you need a modem, and if you're serious about working with Mosaic don't even bother with anything less than 14.4Kbps (28.8Kbps is much better if your service provider supports it). Second, you need an Internet account with a Point-to-Point Protocol (PPP) or Serial Line Internet Protocol (SLIP, pronounced "slip") connection. Third, you need software that lets Windows communicate in TCP/IP (Transmission Control Protocol/Internet Protocol—the communications standard for the Net). And last but not least, you need Mosaic itself.

There are several other ways to connect to the Internet. Two of the most common are gateways and shell accounts. Gateways are usually limited to exchanging e-mail between an online service such as CompuServe and the Internet. With a shell account, you dial in to a computer that's on the Internet and use that computer to send e-mail and access various Internet utilities. Mosaic won't work with either of these types of access systems. Mosaic requires your computer to actually be "on" the Internet—speaking the Internet Protocol.

Fortunately, Internet service providers are popping up all over. Check the ads in your local newspaper, phone your computer store, or download the file PDIAL.TXT from PC Contact's data library 3 (Utilities/Misc.). If none of these pans out, you can try two of the larger international service providers: UUNET Technologies at (800) 488-6384 and Performance Systems International (PSI) at (800) 827-7482.

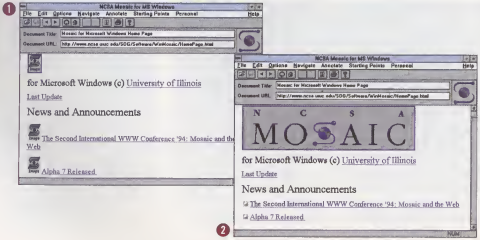
When you call the service provider to set

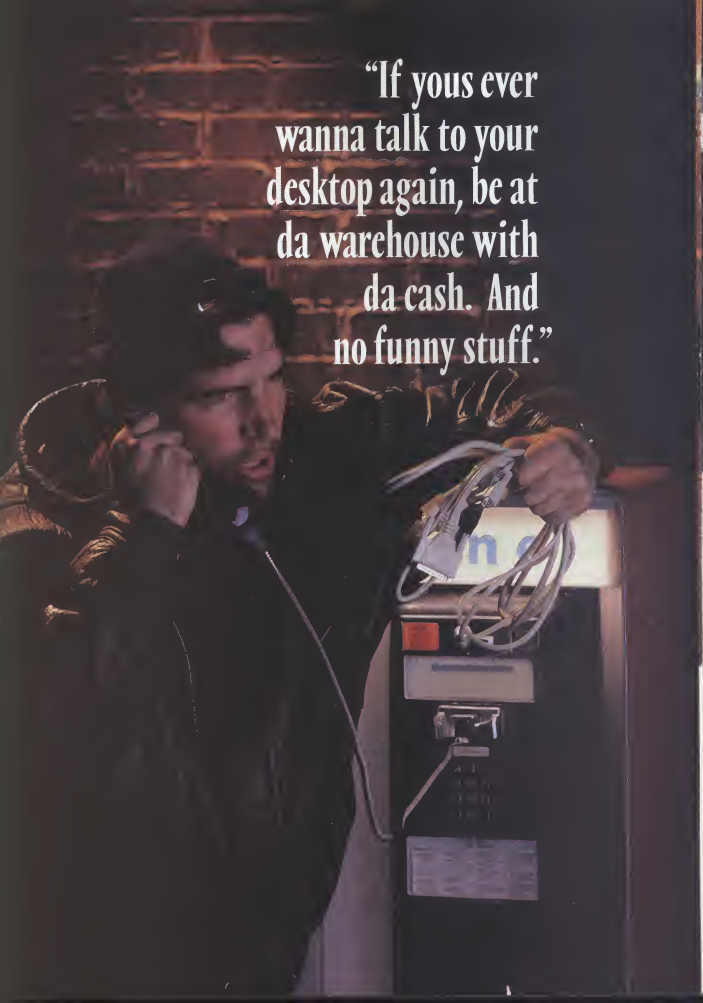
BEFORE AND AFTER SPEED OR **GRAPHICS?** YOU DECIDE

Not So Fast: Unfortunately, even a 14.4Kbps modem is painfully slow at retrieving inline graphics, so our Mosaic setup as posted on PC Contact turns them off. Here's how to turn them back on.

1. Less Filling: The graphics are not really removed from the documents. Rather, the images are replaced by placeholders. As a result, most files will look similar to the figure on the left, with icons where the images should be.

2. Looks Great: Choosing Display Inline Graphics from the Options menu turns the same page into a colorfully formatted document. You can edit MOSAIC.INI to display images by default, or you can load individual graphics by right-clicking on the placeholder, usually the best method.




"If yous ever
wanna talk to your
desktop again, be at
da warehouse with
da cash. And
no funny stuff."

Whatever ... Obviously, Rex Ruthless, notorious cablesnatcher, doesn't know about the new Liberty™ portable PC from Gateway 2000® Loaded with infrared technology, the Liberty lets me transfer files between my desktop PC and even from Liberty to Liberty. It's a portable PC user's dream! No cable — and no more blackmail.

I'm just relieved Rex didn't kidnap my Liberty. It's an entirely new dimension of portable computing. In addition to amazing infrared technology, the Liberty touts an impressive 10.4-inch screen — an incredible feature in a 4.2-pound PC with a footprint of only 10 by 8 inches. This display gives me 23 percent more active viewing area than a 9.4-inch screen.

Plus, the Liberty gives me a plethora of other fantastic features, like its "intelligent battery" that allows for upgradability to future technology including lithium ion.

Best of all, the Liberty is a portable powerhouse packed with features like a 50MHz or 100MHz processor, a whopping 24MB of RAM, removable 720MB hard drive, TelePath™ 14.4 XJACK® fax/modem, Microsoft® Office Professional and carrying case, all for only $4,799. It's the best combination of portable performance and value available today! You can bet I'd be at the warehouse with loads of cash if Rex had snatched this treasure.

You see, Rex is doing whatever he can to keep my exposé about Gateway's new portables under wraps. But while I was working the PC beat with my trusty Liberty, I got the scoop on the new ColorBook²™ from Gateway. It has the same great

combination of color and performance as Gateway's original ColorBook,™ but the ColorBook² is souped up with multimedia features including integrated 16-bit sound and speaker, EZ Point™ integrated pointing device and larger hard drives. Plus, the battery can now be charged while the PC is in use.

Gateway's top-of-the-line ColorBook² DX4-100 Deluxe comes standard with 8MB RAM, 720MB hard drive, TelePath 14.4 fax/modem, carrying case, MS Office Professional and a 10.3-inch dual-scan STN color display, all for only $3,999.

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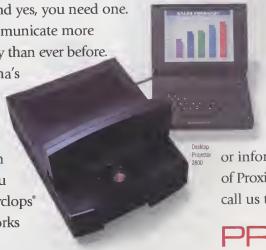

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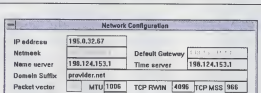
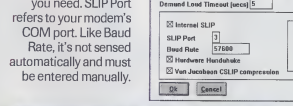
EXPERT TIP CONFIGURING TRUMPET WINSOCK

SLIP Up The Network Configuration dialog box for Trumpet Winsock lets you establish all the settings you need. SLIP Port refers to your modem's COM port. Like Baud Rate, it's not sensed automatically and must be entered manually.





Demon Dialer: You can configure Trumpet Winsock so it will dial automatically or on demand, using the Dialler Options menu.

up your connection, specify that you need either a SLIP or PPP account—these are the types of connections that Mosaic can use over modem lines. Most providers offer both. With SLIP or PPP, your computer essentially becomes a node on the Internet. (There are lots of things you can do without SLIP or PPP—like reading e-mail and browsing newsgroups—but running Mosaic on your PC isn't one of them.)

Acquire the following details about your account from the service provider: Your IP (Internet Protocol) address, netmask, default gateway, e-mail address, and name server (sometimes called a domain naming system, or DNS). You'll need these when installing some of the networking software that runs under Mosaic (specifically, Trumpet Winsock). Usually, you'll be provided with these details when you subscribe.

Getting the Right Software Let's say you have your account and its associated information in hand. Next, you'll need two bits of software to launch your Mosaic session. The first one is Trumpet Winsock, the best of the shareware packages for enabling TCP/IP in Windows. The other package is Mosaic itself. Both are available on the Internet, but we've bundled them together and placed them on PC Contact (see "Mosaic Toolbox," page 214). If you have access to PC Contact, you need only download and unzip the appropriate bundle. Otherwise, contact Public Brand Software at (800) 426-3475 to get the files you want on disk (for a modest packaging and shipping fee). Or, if you already have some kind of access to the Internet (or know somebody who does), you can get the packages using the Internet's FTP procedure.

We're making six separate file archives available on PC Contact. Three contain the Trumpet Winsock package (if you don't already have TCP/IP and Winsock running under Windows) and various versions of Mosaic. The other three contain those versions of Mosaic, but cater to users who already have Winsock software installed. For the remainder of this article we'll assume that you need both Trumpet Winsock and Mosaic.

If you want to retrieve the files from the Internet, you'll need access to FTP (File Transfer Protocol). Any number of Internet books can show you how FTP works; essentially, it lets you log in to a remote machine and download software. You'll find the Trumpet Winsock package at oak.oakland.edu, in the directory /PUB/MSDOS/WINSOCK. The filename is TWSK10A.ZIP. Mosaic is available via FTP from ftp.ncsa.uiuc.edu, in the directory /PC/MOSAIC. The 32-bit version is WMOS20A7.ZIP, and the Win32 extensions are WIN32S.ZIP. If you want the 16-bit version, enter the directory /PC/MOSAIC/OLD, and get the file called WMOS20A2.ZIP.

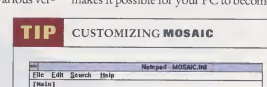
Once you have the archives you need, create a directory called C:\WINSOCK and put them there. Then uncompress them. Next, create icons in Program Manager for your two new program files, TCP Manager (TCPMAN.EXE) and Mosaic (MOSAIC.EXE). You can do this by opening Program Manager, opening the Main program group, and selecting File, New, Program Item, then filling in the blanks in the resulting dialog box. After Command Line, enter the name of the program you're adding. Repeat the process for the other application.

There's a chance that your service provider offers Winsock software with easy installation instructions. If so, you won't need the Trumpet Winsock software we've provided. Some providers even have an automatic installation procedure for their Winsock package.

For now, however, let's assume that you're using Trumpet Winsock. To configure it, load the TCP Manager program. A setup screen will appear, asking for details such as IP address, domain suffix, gateways, and other information that your service provider should have sent. If you don't have that information, contact your provider. There's nothing you can do without it.

The Winsock data, when combined with your provider's SLIP or PPP service, makes it possible for your PC to become a

TIP CUSTOMIZING MOSAIC



Your Name Here: After setting your e-mail address in MOSAIC.INI, you can change home pages' background color and set other preferences. Multimedia and other technical settings come further down in the file.

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Any way you look at it.

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full-fledged Internet node, at which point you can use Windows-based GUI software. Mosaic is one such program.

Note: Configuring the socket software is the hardest part of the procedure. Once you've passed this stage, everything else should be easy. But until that happens, you can't go any further.

Installing Mosaic To get Mosaic running properly, you first need to copy the MOSAIC.INI file into your main Windows directory (typically C:\WINDOWS).

If you want to run the latest version of Mosaic, 2.0alpha7, you'll need to install Microsoft's 32-bit Windows extensions. Since we're swell people, we included them with the PC Contact files. Unzip the files into a directory called WIN32TMP, then go to Program Manager, select File, Run and run C:\WIN32TMP\SETUP.EXE. (Actually, the name of the directory into which you unzip your files isn't that important, but WIN32TMP is a good temporary resting place for the files.) You'll need roughly 1.5MB of free disk space.

The next step is to edit MOSAIC.INI very slightly, using any text editor (Notepad or Windows Write will do). In the first line, type your full e-mail address—your service provider should have provided you with one. Leave the other lines as they are, but eventually you might want to change them. In the PC Contact files, several of the other lines have been preset. The Home Page line, for example, automatically loads a document included with our files. You can change this if you want (although you'll be missing out on some very neat stuff). Also, the Grey Background feature has been set to "no," since white is more readable on Windows desktops. There are several other customization choices, letting you configure graphics viewers, and sound and video players. When you have Mosaic running, use File, Load Local File to call up MOSINI.HTM (included with the PC Contact files) which explains these options.

You're Almost Done Close TCP Manager and your text editor, and then double-click on the Mosaic icon. A page titled "Welcome to Mosaic" will appear, and if you've ever used the Windows help system you'll immediately know what to do: Just click on one of the blue underlined hyperlinks, and you're off into the Web.

Mosaic has two ways of letting you know what's going on. The first, the famous globe in the upper right corner, spins when the program is retrieving data. The second, the status bar at the bottom, tells you precisely what is transpiring. If the globe keeps spinning but the status bar is still trying to get started, you have a bad connection somewhere. It might be your Winsock setup, but it might just as easily be a problem with the service provider or the remote computer. Generally, though, as long as Mosaic gets past the first status message, "Doing nameserver lookup," you can rest assured that you're up and running. After that, it's a matter of faith in telecommunications.

Surfing the World Wide Web The "Welcome to Mosaic" page we've included with the PC Contact files connects you to some of the most useful sites on the Web. We've also added a *PC Computing* menu item in the menu bar with additional interesting sites. As you come to sites of your own, bookmark them by using the Navigate, Menu Editor feature. Once installed, Mosaic is a snap. And the World Wide Web is jammed with fascinating sites. Work or play, you'll find a great deal to do.

NEIL RANDALL *is a regular contributor to* PC Computing *and author of several books on the Internet.*

ACTION ITEMS — TAKE THESE STEPS TO GET ON THE NET

1. **Sign up.** Contact a service provider and get an Internet account that provides SLIP and/or PPP access.
2. **Set up.** Create a new directory on your hard drive and call it C:\WINSOCK.
3. **Make way.** Add C:\WINSOCK to your path in AUTOEXEC.BAT.
4. **Get files.** Either download the appropriate files from PC Contact (see "Mosaic Toolbox," above right), or, if you have FTP access to the Internet, download WINSOCK and MOSAIC from the addresses mentioned under "Getting the Right Software" on page 212.
5. **Decompress.** Unzip the files you download into C:\WINSOCK.
6. **Set interface.** Create an icon for TCP Manager (TCPMAN.EXE) and Mosaic (MOSAIC.EXE).
7. **Customize.** Double-click on the TCP Manager icon and specify your Internet addresses and parameters.
8. **Place.** Copy MOSAIC.INI into your main Windows directory (usually C:\WINDOWS)
9. **Configure.** Edit MOSAIC.INI to set preferences (see "Customizing Mosaic," page 212 for more information).
10. **Shake hands.** Log in to your access provider, and establish a SLIP or PPP connection.
11. **Blast off.** Double-click on the Mosaic icon to launch Mosaic.
12. **Roam.** Surf's up!

PC Contact — MOSAIC TOOLBOX

A Few Easy Pieces

We've made using Mosaic a simple matter of downloading a file or two. In PC Contact's data library 3 (Utilities/Misc.) you'll find three files containing Mosaic and Trumpet Winsock. MOS22.ZIP contains Version 2.0alpha2 of Mosaic, the last 16-bit edition. MOS27.ZIP contains 2.0alpha7, the most recent 32-bit version. To run the 32-bit version, you'll also need the Windows 32-bit extensions; if you don't have them, download MOS32.ZIP, which contains these extensions along with 2.0alpha7. If you already have Winsock support, download these three files: MOS1.ZIP contains the 16-bit Mosaic, while MOS2.ZIP has 2.0alpha7 along with the Win32 extensions, and MOS3.ZIP contains only 2.0alpha7. See page 330 for downloading information. These files are also available on disk from Public Brand Software for a small fee. Call (800) 426-3475 to order.

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ADI

GIVE EXCEL 5.0 A FAST BOOST

Personalize Your Number-Cruncher

Lifesavers When you think of all the work that spreadsheets do for you, it's hard to imagine how anybody ever worked without them. To get some extra mileage out of your spreadsheet, find ways to customize it to the way you think and work. If you work with Microsoft Excel 5.0, take some time to evaluate the way you use it. Chances are, Excel can automate tricky tasks and do more for you than you realize—but you need to give it a nudge to help it work in your favor.

New Toolbar First off, customize your standard toolbar so that you have immediate access to all of the tools you need. Save space by removing icons whose tasks can be accomplished with a quick keystroke, such as bold (Ctrl-B), italics, (Ctrl-I), Fill Down (Ctrl-D), and Fill Right (Ctrl-R). If you execute certain tasks regularly, customize your Auto Fills so you don't need to enter information over and over again. And while you're at it, save your formatted chart so AutoFormat can take care of that task the next time around, which does wonders for corporate consistency.

Easy Does It Excel takes care of as much of the dirty work as it can. If you find yourself doing the same tasks over and over again, chances are you can automate the process. This may be as easy as adding an icon to your toolbar, or slightly trickier, such as recording a macro. The productivity rewards are immeasurable.

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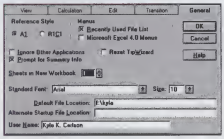
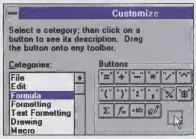
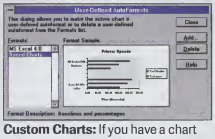
GUIDED TOUR UP AND RUNNING WITH EXCEL 5.0



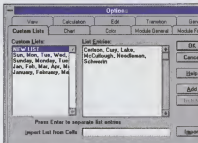
Working Order: When you start a new file, you usually need only one worksheet in your workbook. Under Tools, Options, choose the General tab and set Sheets in New Workbook to 1. It's easy to add worksheets (Insert, Worksheet).



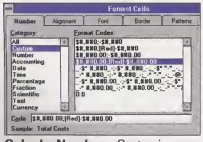
A Better Default: To edit an existing toolbar, right-click on it and choose Customize. To create a new one, right-click on the toolbar and choose Toolbars. Enter a Toolbar name, then click New.



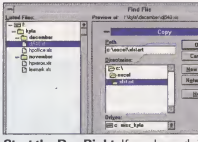
Custom Charts: If you have a chart style you prefer, save it as an AutoFormat option. From your chart, right-click and select AutoFormat (or select Format, AutoFormat). Select User-Defined under Format Used, then click on Customize. Click on Add and type a name and a description.



Fill 'er Up: Save time by creating customized lists for AutoFill. Under Tools, Options, select the Custom Lists tab. Click on New List and add the entries in your list, separated by commas. Then click on Add.



Color by Numbers: Customize your number formats—to display all negative values in red, for example. From Format, Cells, choose the Number tab. You can choose a predefined format for various number types, or create your own by selecting Custom.



Start the Day Right: If you have daily tasks in a long-term project, you can make those files open automatically when you launch Excel. Use your Windows File Manager or Excel's Find File to copy those files to your EXCEL\XLSTART directory.

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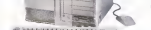

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SETTING UP A HELP DESK

Get By with a Little Help from the Desk

If you're in a small office, your idea of a help desk is probably something like this: The receptionist has a neighbor who knows someone whose cousin is married to a computer whiz who doesn't mind answering frantic phone calls when your printer starts making strange wheezing sounds. Of course, you can't always catch that person when you need help. But it's free, so you can't complain. Or can you?

Onsite technical support is often the first victim of downsizing. "They'll manage," says the boss about the frenzied employees. But they don't. Not for long, anyway. Without a help desk, users avoid features they don't understand. Imagine sending out 100 form letters without using the merge feature. Or calculating complex formulas on a calculator, then typing the results into the spreadsheet because you can't find the right function. And when serious problems occur, they're swept under the rug: "OK, my color screen is only displaying black and white, but it can't be serious. And what's that screeching sound from the hard disk when I save a file? Probably nothing."

For most users, computers are a paradox: They're designed to make work easier, but unless someone's there to hold your hand, they just complicate things, making it impossible to meet deadlines. Help desks are essential. Regardless of the size of your organization or its budget, you must provide some support to your computer users.

We surveyed help-desk gurus and they agreed that the cost is justifiable, and ignoring the problem is not. See "Invest Now for Amazing Savings," page 224, for a return on investment (ROI) example. And see "Let Your Keyboard Do the Walking," page 226 for a home-grown software solution.

Expert Advice Before you launch your own help desk, consult the following checklist, composed by Brian Hood of the Department of Defense, and Carl Jackson and Lori Anzini of East Bay Municipal Utility District (see "Setting up Command Posts for Large Workgroups," page 224):

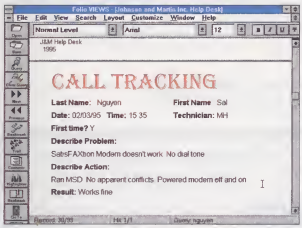
1. **Insurance** Secure management's support for a help desk. Get commitment for ongoing funding and staffing. Show them ROI figures, and let them know how vital the department is to smooth operations.

We found that a busy two-person help desk could pay for a $10,000 investment (in office equipment) in a few days. Here's how: Say that a typical call is 1 hour long and saves 7 hours of an employee's time (these numbers are based on Department of Defense data). Assume that employees who call the help desk earn an average of $15 per hour. So every call they

TOOLS OF THE TRADE CREATE YOUR OWN CALL-TRACKING PROGRAM

"My Hard Disk Crashed! My system won't boot! Helllllp!" "Someone else called with the same problem yesterday. You need to remove the floppy disk from your drive A."

Whether you take dozens or thousands of tech support calls a day, you need an efficient call-tracking system. The same problems surface time and again, and you shouldn't have to solve them anew each time. Having a good information database (or infobase) guarantees an efficient response system because you can look up similar problems and recycle the answers. With a good reporting system, you narrow down the most common problem areas and arrange appropriate training.



Easy and Powerful: Create a Help Desk call-tracking application with Folio Views. It feels like a word processor, yet has the power of a database.

Off-the-shelf help-desk software can be very expensive, typically selling for thousands of dollars. If that's out of your reach, create your own system. Try askSam 2.0 or Folio Views 3.1 IPK. These free-form databases offer full-text searching, and askSam even comes with a sample help-desk application. Folio Views is more expensive, but offers more features and programming muscle.

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make to the help desk is saving you $105 (7 hours saved times $15 per hour). How long before you recoup your investment? Only 96 calls—at 16 calls per day, that's 6 days. If you assume shorter calls and lower per-call time savings (5-minute calls and a 30-minute time savings) the results are also impressive: You'll recoup that $10,000 investment in just over eight days. (In this scenario the desk will be answering 192 calls a day, which is optimistic, but you get the idea.)

2. Needs Analysis Find out the number of users and the products they use. In rough terms there's a 1-to-200 ratio (support staff to clients) if the users are skilled, and 1-to-100 if they're beginners.

3. A Few Good Recruits When hiring, look for a comprehensive background, including networking, hardware, and software. Look for strong phone skills dealing with distraught people, and proof that the individuals work well under stress.

4. Lay Down the Law Implement guidelines for the department. Describe the kind of service you'll provide.

5. Problem Logging Let users know what services you're providing and how to get help. Instruct them in what to do before they make a call (write down error messages, list the software loaded, and so on).

6. Plug In Set up the communication hardware. Look for efficient phone and voice-mail systems. And a good e-mail system will prove to be indispensable, too.

7. Go Online Purchase at least one computer for each member of your support staff. Configure these systems exactly as your users' systems are configured.

8. Who, What, When Purchase tracking software for inquiries that features call logging, text search, and reporting capabilities.

For more information about help desks, consult Barbara Czegel's *Running an Effective Help Desk* (1994, John Wiley & Sons). The key to a successful help desk is the expertise of its staff. Prepare to invest in ongoing training for your support specialists, because your entire organization relies on them.

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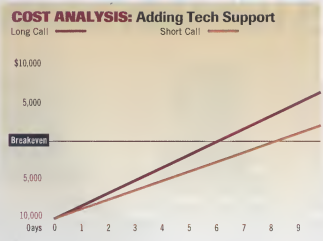

No Time Ten thousand dollars may sound like a lot of money to invest in a help desk, but if that outlay lets you process one technical-assistance call every hour, your help desk can pay for itself in just six days.

WAR STORIES SETTING UP COMMAND POSTS FOR LARGE WORKGROUPS

When Do You Need Help? If you need to support 4,000 users in 12 sites throughout the western United States, you can't afford to overlook even the smallest detail. And when you're the Department of Defense (DOD), you'd better do it right. California-based Defense Logistics Agency, Defense Distribution Region West, has a 20-member help desk, taking hundreds of phone calls a day.

According to Brian Hood, Chief of Information Center Branch, his clients use Microsoft Office, Polaris Software's PackRat, Enable Software's Enable/OA, Software Products International's SPI WindowBase, and several other programs on their PCs. Apple Macintosh users don't rely on the help desk as much as their DOS-based colleagues, and Hood explains that the agency hasn't purchased new Macs in years. All of his existing Mac users are experienced and, therefore, they tend to be self-reliant.

Interestingly enough, peak season for calls is immediately after users have gone through some form of training. When they're complete novices, they don't know enough about their applications to ask, and they normally don't try out unfamiliar or advanced features. After additional training, though, users are curious, and attempt to invoke different features that land them in situations they can't resolve.

How to Divide Work The Information Center at the Oakland, California-based East Bay Municipal Utility District (EBMUD) supports 1,300 users in 25 remote sites throughout the state. The agency has standardized on Windows applications, but still provides support for applications like WordPerfect 5.1 for DOS. There are a few Macs in use, but those users, like Mac users at the DOD, tend to be self-sufficient and don't rely on the help desk.

Eight people staff the EBMUD Information Center. Three are part of the first level system, which handles problems that can be solved within 5 to 10 minutes, and five work at the second level, which is the onsite support system. The average second level call takes 30 minutes to an hour. Questions that start, "How do I . . . ?" are normally dealt with over the phone, but technical problems and software installations are done onsite.

To introduce users to new programs or versions, the Information Center provides 45-minute presentations. In addition, some one-on-one training is available.

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REPORTS OF WOODY'S DEMISE ARE GREATLY EXAGGERATED

Let Your Keyboard Do the Walking

Do you have a favorite Postal Service horror story? Let me tell you mine. Last week my wife got a call from a TV repair shop. "My extreme condolences," the caller said, "I am so very sorry to hear that your husband is dead." Say wuh? I've had this running feud with the postmaster of the Golden, Colorado, post office. They won't bring mail to the house—it's too far up the mountain. They raised my post office box rental from $4 per year to $204 per year. Overnight. Last week they suddenly decided to stop delivering mail to my street address. Apparently somebody thought it would be really funny to mark a letter "Recipient Deceased, Return to Sender." Their little joke damn near gave my wife a heart attack.

Anyway, that's all by way of explaining why we don't use the U.S. mail much anymore. A large portion of the correspondence and tech support for Pinecliffe International and Artemis Associates (our software companies) products goes out by e-mail or fax, and we encourage our customers to use e-mail and fax whenever possible. It's simply faster, easier, and cheaper for everybody. If you run a help desk or tech support group, or if you're in almost any position that requires you to respond to lots of questions, you're probably in the same boat.

All the major Windows word processors have hooks that let you tie in to fax or e-mail. Click File, then Send, grab a fax number or e-mail ID from a phone book, click on OK, and suddenly your document is out over the phone lines. No letter to fold, no stamp to lick, no intransigent postmaster to bother with little details like delivering mail. Click-click-click and you're done.

This kind of reliable mail-consigned-to-the-other packs a huge productivity boost that can save you hours every month. If you have a fax modem, for example, the File, Send command is reason enough to upgrade to Windows for Workgroups 3.11 and its built-in fax handling. Great stuff.

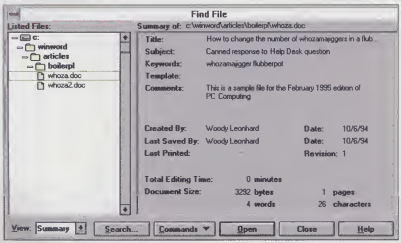
But what about the flip side? Nowadays getting documents out the door is the easy part. Putting together the documents in the first place, though, can be a real pain in the neck. If you answer questions all the time, chances are mighty good that you'll hear a small handful of questions over and over again. Chances are also good that the "monster" answer you put together last month—you know, the one that took hours of research and required four pages of complex logic—is lost somewhere. You'll never find it again.

We Can Help That's where this month's application comes in. HELPDESK.DOT is a Word 6.0 for Windows template that helps you assemble answers to a specific inquiry, using a database of "canned" answers. In fact, it could be used to assemble customized documents from a collection of boilerplate pages—the kind of activity you might find in a real estate firm or a law firm. We'll continue to use the help-desk metaphor, though, because it's bound to be more familiar to a larger part of our audience. If you have a situation that requires assembly of a single document from multiple "canned" boilerplate documents, you'll see immediately how this approach applies. We've used Word 6.0 for Windows because it's the product we know best: You can do the same thing with any other major Windows word processor.

Put yourself in the place of the poor, underpaid, overworked person sitting at a help desk. A question comes in, via e-mail or fax. "How do I change the number of whozamajiggers in my flubberpot? And once it's changed, how do I make the change permanent? Oh, and while I've got you on the line, on what day of the week was Abraham Lincoln born?"

You start out with changing whozamajiggers. That's a common question, so you know the answer off the top of your head. You open a new document. Type in

SNAPSHOT SEARCH BY **KEYWORDS**



Needles in a Haystack: This is what HELPDESK.DOT tells you when you go looking for "canned" boilerplate files. Those files can contain a few sentences or a whole book, including text, pictures, sounds, or any other object that will fit in a Word for Windows document.

Samsung
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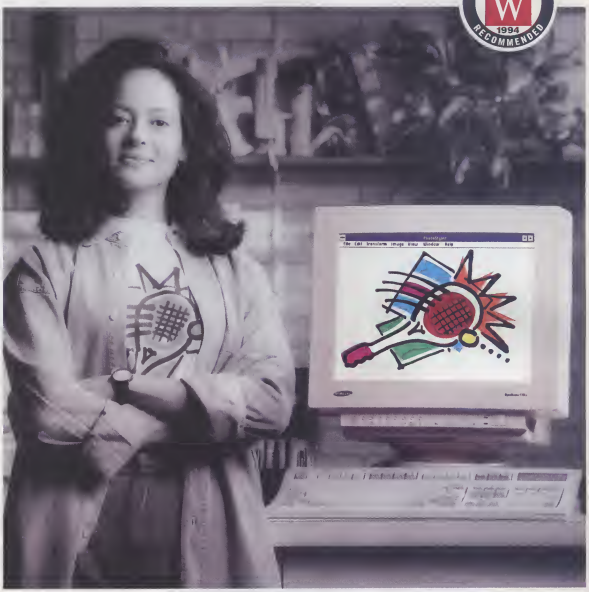

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CRT Size	14"	15"	17"	17"
Dot Pitch	.28	.28	.28	.26
Maximum Resolution	1024 x 768	1024 x 768	1280 x 1024	1600 x 1280
Maximum Refresh Rate at Maximum Res. (Hz)	76	76	60	60
MPR-II (Low Radiation)	•	•	•	•
Power Management	•	•	•	•
Flat Square Screen		•	•	•
On-Screen Programming			•	•
Real Color Control				•
Warranty	2 Years	2 Years	2 Years	2 Years

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Fax-on-demand System now available for product specifications 201-229-4053

Circle 139 on reader service card.

the requester's name and the date, say:

```
Rufus Ratatat
February 29, 1995
```

Then you expound on changing whozamajiggers for a couple of minutes—the words flow out of your head, on autopilot. You also know how to make the change permanent, but that one's a little harder, and it takes a few minutes to make sure you get the wording down in a form that a beginning user can understand. Then you hit the Abe Lincoln question, and it sends you diving for the documentation. (Presidents *are* documented, aren't they?) Flip-flip-flip. There's the answer. You type:

```
Abe was born on a Tuesday.
Thanks for your inquiry!
The Help Desk Geek
```

Click on File, then Send, pick up an e-mail address or phone number, and you're finished. Total time, oh, ten minutes.

Now Do It Right Time to consider a much better approach. You get Rufus's inquiry, and start a new document. The computer prompts you for the recipient's name and automatically inserts the date, then asks you for keywords. You type in whozamajigger. Next you get a list of all the documents it has with the keyword whozamajigger. You scroll through the list—with full access to documents' descriptions, titles, authors, creation dates, other keywords, even a full file preview—pick the one that deals with changing whozamajiggers, click once and *boom!* the "canned" response is slapped into your letter to Rufus. Push a button, scan for whozamajigger *and* permanent, pick the document that contains the next answer, and that canned text goes into your letter to Rufus.

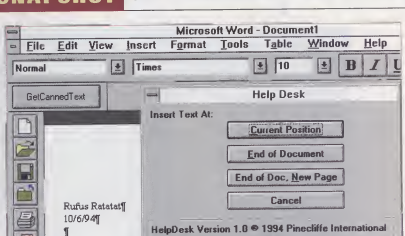
Finally, you know you don't have the answer to the Abe Lincoln question, so you look it up, start a new document, and type:

```
Abe was born on Tuesday.
```

Then File, Close the document, assigning it the keywords Abe Lincoln birthday. Back in your response to Rufus, you click on a button, type in Lincoln, pick the document you just created, and it's in your response to Rufus. Click on File, then Send, and your missive to Rufus is on its way.

Total time: oh, maybe five minutes. And the next time somebody asks about Abraham Lincoln's birthday, you can get the correct answer for them in seconds.

SNAPSHOT GETTING **RESULTS**



Filling In: You have the option of inserting the boilerplate either at the current cursor location, at the end of the document, or on a new page at the end of the document (helpful if you want to keep a full page of information together). And the best news is, there are no size restrictions.

How does it work? HELPDESK.DOT uses Word for Windows' built-in Find File capability to help you locate the pieces of canned text. Find File is one of Word for Windows' most complex functions, so a little review is in order.

Word for Windows' File Summary Information (select File, Summary Info...) contains entries for a document's Title, Subject, Author, Keywords, and Comments. Once you've typed in a Subject for a particular file, select File, Find File to retrieve a list of documents that match the Subject. Find File can also restrict the search to certain subdirectories, or to files with a certain extension. Finally, Find File lets you assign a Search Name to a particular criterion, then recall the criterion with a single click. For example, you could set up the search called Outstanding Invoices to look for all files with a name *.INV in the C:\INVOICE\CURRENT and C:\INVOICES-\PASTDUE subdirectories. Play with it for a bit and you'll see what's happening. In particular, check out what happens when you click on the Advanced Search button.

To get HELPDESK.DOT going, either follow the instructions in "The Help-Desk Macro," (page 232) or—much easier—simply download the file HELPD.ZIP from PC Contact, unzip it, and put the resulting HELPDESK.DOT in your \WINWORD-\TEMPLATES subdirectory. The whole application is yours for the cost of a download. (See page 330 for information on downloading from PC Contact, or, if you're modem-challenged, call (800) 426-3475 to order the disk from Public Brand Software.)

Keywords Are Key The template HELPDESK.DOT assumes that you set up these little snippets of canned responses in their own documents, and that you give the documents useful keywords. For example, you might have one canned response that describes how to change the number of whozamajiggers in a flubberpot. That response would be in its own document, and you'd give it keywords of "whozamajigger flubberpot." You might have another canned response on how to make the change in the number of whozamajiggers permanent, and stick it in a second document with keywords "whozamajigger permanent."

When you create a new document based on HELPDESK.DOT—say, a response to somebody like Rufus Ratatat—you'll be asked for the recipient's name. Type that in, and HELPDESK.DOT will create a brand-new document and put in the recipient's name and today's date. Then it will ask you for keywords. If you type in the keyword whozamajigger, for example, Find File will go out and find the documents that have that keyword. (See "Search by Keywords,"

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P017

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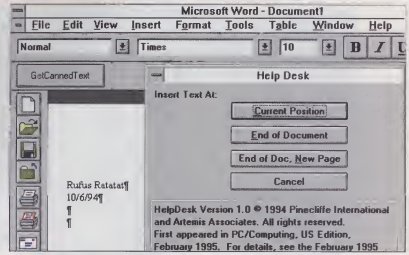

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Circle 152 on reader service card.

page 226). Double-click on the document that contains the answer you want and you'll be asked if you want to put the response at the current cursor location, at the end of the document, or at the end of the document preceded by a page break (see "Getting Results," page 228).

If you want to go looking for another piece of boilerplate, just click on the button that says GetCannedText (see the upper left corner of "Getting Results"). You'll be asked for a keyword, and when you've chosen the correct file, you'll have a chance to put it at the current cursor position, at the end of the document, or at the end preceded by a page break.

Neat, huh?

Awkward, but Worth It We tried HELPDESK.DOT on several tech support types, and it worked pretty well—once they got used to the way Word does Find File searches. HELPDESK.DOT uses the keywords you've typed in, but Find File uses the search arguments (the list of subdirectories to be searched, the filename extensions, and so on) that are left over from the previous search. It takes a bit of acclimation, but once you get the hang of it, it's a snap.

We've tapped into all of Find File's features, including named searches, file preview, and the rest. It's quite powerful and amazingly fast, if a bit cumbersome. When you're more proficient at Find File's operation, you'll see how easy it is to set up categories of responses in different subdirectories, say, and limit your searches to specific subdirectories by using the named search capability. For example, you could store all the responses appropriate to Version 2.0 of your product in the subdirectory \VERSION2 and all the responses appropriate to Version 6 in \VERSION6. Then, by judicious use of named searches (say, three different named searches, "Only Version 2," "Only Version 6," and "Both Versions 2 and 6") you'll greatly reduce your chances of giving an answer for the wrong version!

Help-desk and tech support folks are the salt of the earth. We hope this template goes a little way to making their lives easier. For more help-desk tips, see "Get By with a Little Help from the Desk," page 222).

WOODY LEONHARD & VINCENT CHEN

Got a great snail-mail horror story? We'd love to hear about it. Drop by the PC Contact forum, and bug Woody at 72241,2123, or Vince at 72241,2221.

SUPERSCRIPT THE HELP-DESK MACRO

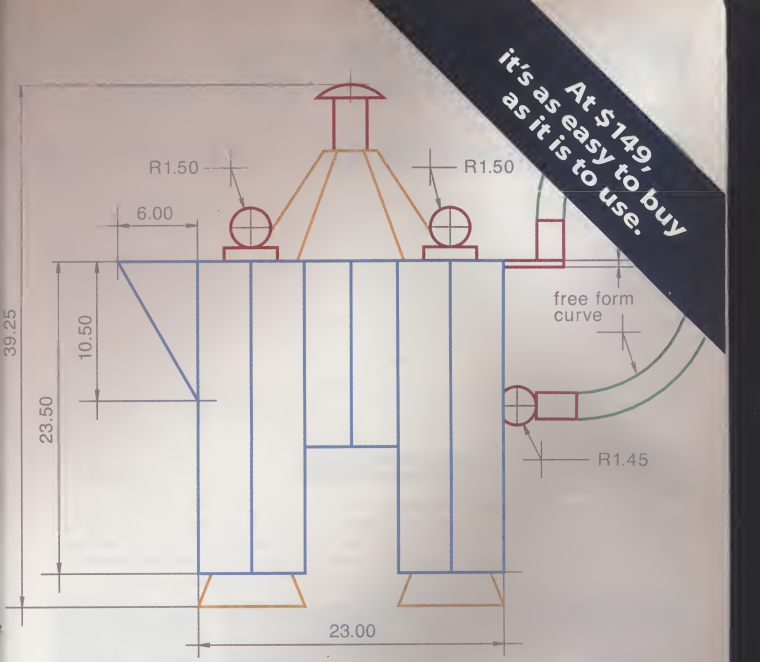
To create HELPDESK.DOT, fire up Word 6.0 for Windows, create a new template by clicking on File, New, Template, and OK. Click on File, then Save, type in HELPDESK.DOT, and you're ready. Select Tools, Macro, type AutoNew, click on Create, and type in this macro. (AutoNew macros run when you click on the New button on the toolbar.)

```
Sub MAIN
msg$ = "Enter Recipient Name:"
On Error Goto Bye
rname$ = InputBox$(msg$, "HelpDesk", "Name")
On Error Goto 0
Insert rname$ : InsertPara
Insert Date$() : InsertPara : InsertPara
GetCannedText
Bye:
End Sub
```

Click on Tools, Macro, type GetCannedText, and click on Create. Type:

```
Sub MAIN
Dim ff As FileFind
GetCurValues ff 'Get FileFind dialog values
msg$ = "Keywords to Search (" + ff.SearchPath + "):"
On Error Goto Bye
keys$ = InputBox$(msg$, "HelpDesk - KeyWords", "keyword")
On Error Goto 0
ScreenUpdating 0
ff.View = 2
ff.Keywords = keys$
ans = Dialog(ff) 'Fire up the FileFind dialog
If ans <> - 1 Then Goto Bye
= FileName$()
FileClose 2
ScreenUpdating 1
Begin Dialog UserDialog 434, 208, "Help Desk"
Text 10, 7, 300, 13, "Insert Text At:"
PushButton 140, 23, 200, 21, "&Current Position", .BtnCurrent
PushButton 140, 51, 200, 21, "&End of Document", .BtnEnd
PushButton 140, 79, 200, 21, "End of Doc, &New Page", .BtnNew
CancelButton 140, 107, 200, 21, .ICancel
GroupBox 3, 134, 426, 73, ""
End Dialog
Dim dlg As UserDialog
answer = Dialog(dlg, 1)
If answer = 0 Then Goto Bye
Select Case answer
Case 1 'BtnCurrent
' Nothing
Case 2'BtnEnd
EndOfDocument
Case 3'BtnNew
EndOfDocument
InsertBreak
Case Else
' Should not happen
End Select
InsertFile .Name = f$ : InsertPara
Bye:
End Sub
```

Click on File, Save. To run the macro, select File, New, HelpDesk, OK.



Twenty minutes ago this was a cocktail napkin.

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OUR TECHNICAL STAFF RESPONDS

Questions, Answers, and Tips

Need to tweak your memory to make Windows run? Want your batch file to beep? How about referencing a page number in an Ami Pro document, or calculating dates in WordPerfect 6.1 for Windows? We answer these and other readers' questions about Windows and DOS, and share tips and tricks for your favorite applications.

TOO AGGRESSIVE

Question: *I recently installed MS-DOS 6.0 for the antivirus utility and defragmenter. I also ran* MEMMAKER *to see if it could free up any more memory.* MEMMAKER *edited my* CONFIG.SYS *file and added the line* EMM386.EXE I=B000-B7FF WIN=B500-B7FF WIN=B200-B4FF. *This gives me 607K of free conventional memory, but Windows won't run (I get the message "Windows cannot set up an upper memory block at segment B000"). Is there a way to work around this?*

NOEL CADDY
CORVALLIS, OREGON

Answer: It looks like you asked MEMMAKER to perform an aggressive customization of your memory and that's causing you some problems.

MEMMAKER has set up your system to include (I=Include, natch) the region of memory from B000 to B7FF. That's memory usually devoted to monochrome video. Many systems can allocate this memory area and gain the extra space with no problem. Other systems (like yours, it seems, and quite a few in our office) can't. Very often, Windows won't load, which is what you're seeing. You can try a couple of things. The simplest is to remove the I=B000-B7FF statement, but then you'd lose that memory.

Most likely, you're running into the "mono UMB" problem. The solution is to tell SYSTEM.INI to load MONOUMB2.386. First you'll need that file, so you'll need to expand it off your Windows distribution disks. It should be on disk 4, so insert disk 4 into your floppy drive and type:

```
EXPAND A:MONOUMB2.38_
C:\WINDOWS\SYSTEM
```

Open SYSTEM.INI (in your \WINDOWS directory) using any text editor, and go to the [386Enh] section. Then add the line

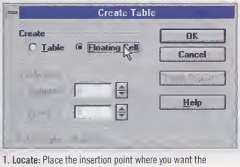
```
device=monoumb2.386
```

Save and exit. This file will enable Windows to address that area of monochrome memory. This is the most likely solution to your problem.

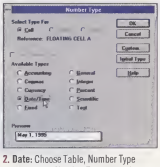
Alternately, you could try leaving this statement alone and modifying your WIN= statement instead. Right now, you have two of these, which allocate the memory from B200 to B7FF. Why you have two is completely beyond anybody here—you could just as easily have WIN=B200-B7FF and get the same effect. Anyway, you could try

STEP BY STEP CALCULATE DATES IN WORDPERFECT

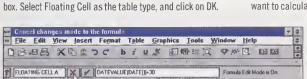
Simple Math: WordPerfect 6.1 for Windows makes it easy to calculate the date for any day in the future. This can come in handy if, for example, you're preparing invoices or statements where you must indicate a specific due date. Here's how to insert a future date based on 30 days from today's date.



1. Locate: Place the insertion point where you want the date to appear. It can be anywhere in the document. Choose Table, Create to display the Create Table dialog box. Select Floating Cell as the table type, and click on OK.



2. Date: Choose Table, Number Type to display the Number Type dialog box. Select Date/Time to specify that you want to calculate the number as a date.



3. Formulate: Choose Table, Formula Bar to display the Table Formula Bar. In the entry box of the Formula bar, type DATEVALUE(DATE()+30, and press Enter. (If you want to advance the date a different number of days, change the formula accordingly.) Click on Close to close the Table Formula Bar.

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What a mess! Windows programs leave fragments in every corner of your system. So, even after you've attempted to remove them, you end up running low on hard disk space.

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With amazing new **CleanSweep**,™ you'll have spotlessly clean Windows. ***Reclaim megabytes of storage*** for dramatically **more hard disk space** and **better system performance!**

Easy-to-use **CleanSweep** is the safest, most powerful uninstaller...and more! Designed by **Quarterdeck**® to run ***in all Windows environments***, it sweeps away outdated applications and unnecessary files **safely and completely!** Now, you can...

- **Uninstall Unwanted Applications:** Analyze programs instantly...then do thorough uninstalls file-by-file or all at once.
- **Remove Unused Files:** Get rid of temporary files, backup files, archive files, help files, graphic files.
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Circle 187 on reader service card.

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moving Windows' memory to a different location, like C800-CFFF.

You could also try a third-party memory manager like Quarterdeck's QEMM or Helix's NetRoom. They both have some remarkable ways of eking out drops of memory where you never believed there were any. (For example, each includes some device drivers rewritten especially to occupy little memory.)

To get even more memory, try DOS 6's multi-config feature. Multi-config gives you an easy way to boot your system and load only the TSRs and device drivers that you need. You'll have to edit your CONFIG.SYS and AUTOEXEC.BAT files to get it to work. Make backup copies of them before you try this. If something goes wrong, simply restore the working files.

Consult your online help in DOS for more information on this, or see "Memory Management: Don't Bother," June 1994, page 260. By using multi-config you can give your system a bit more memory, but you'll have to reboot it to access a device that wasn't loaded at boot time.

GET THE BEEP

Question: *Is there a DEBUG script that will sound the PC's speaker to warn me when a batch file is about to do something?*

MICHAEL GERMAIN SR.
ROBERTS, WISCONSIN

Answer: You don't even need a DEBUG script—you can make your speaker beep from any DOS batch file by inserting Ctrl-G. Open EDIT, type ECHO, and press Ctrl-P, then Ctrl-G. The Ctrl-P tells EDIT to insert the next character you type as a character, rather than trying to interpret it. A character that resembles a large period should appear on your screen. That large period will trigger your speaker. You can insert ECHO Ctrl-G before any line that requires an audio alarm.

HOT TIP BOOKMARKS IN AMI

Problem: You want an automated way to reference the page number of a specific item later in a document.

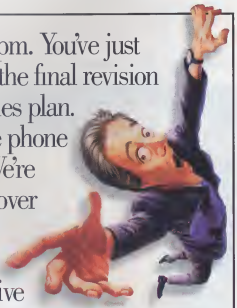
Solution: Use Ami Pro's bookmarks. Select the item you want to reference and select Edit, Bookmarks. Type a name for the bookmark (for example, DiagramOne) and choose Add. Go to the place in the document where you want to reference your item, and choose Edit, Power Fields, Insert. Type the following text:

PageRef DiagramOne

Replace DiagramOne with the name of your bookmark.

LOTUS DEVELOPMENT CORP. TECHNICAL SUPPORT

It's 3:50 pm. You've just finished the final revision to the sales plan. Then the phone rings. "We're sending over 10 new pages of competitive info." Click. Good thing they lock the windows on this floor. You have to get it into the plan by the end of the day. What now?



You think she's finishing the proposal. She thinks you are. Surprise, neither one of you is. And it's 4 hours before the grant committee meets. Let's see, 16 new pages of data, 11 article reviews, 3,600 words sent by your partners in Istanbul. Who can type faster? What now?

MWBACKUP PROBLEMS

Question: *What do you know about a DOS file (that's also a Windows device driver) that will let Microsoft Backup for Windows access a tape drive? The file,* VFINTD.386, *was rumored to be included with MS-DOS 6.0.*

AWBREY G. NORRIS
WINTER SPRINGS, FLORIDA

Answer: VFINTD.386 is indeed included with MS-DOS 6.0—in fact, it should have been installed automatically into your DOS directory and, if you asked for it, Windows should have included it as a device to load in SYSTEM.INI. But it has nothing to do with tape drives: It's Windows' virtual floppy disk driver, specifically designed so that Microsoft Backup for Windows can gain exclusive access to your floppy drive. If you want to talk to a tape drive, you're going to need a device driver specifically for that tape drive. If you're still interested in VFINTD.386, you'll find it on Disk 3 of the 5.25-inch MS-DOS 6.0 disks, or Disk 2 of the 3.5-inch disks. The file you need is called VFINTD.38_, and it's compressed. Place the disk in the drive and type the following line:

```
EXPAND A:\DOS\VFINTD.38_ C:\DOS
```

To use it, you'll have to edit Windows' SYSTEM.INI file. First, open SYSTEM.INI in any text editor, and go to the [386enh] section. Replace the line

```
DEVICE=*VFD
```

with the line

```
DEVICE=C:\DOS\VFINTD.386
```

Microsoft Backup for Windows should now be able to gain exclusive access to the floppy drive.

Edited by JAMES CURY. *Technical assistance provided by* MATTHEW LAKE, YAEL LI-RON, JOHN MONTGOMERY, SCOTT NAYLOR, WENDY TAYLOR, *and* MICHAEL BOLTON *of Quarterdeck.*

CONTACT GET IN THE QUEUE

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187 pages of legal briefs have just arrived at the office. On your desk. Apparently, your boss wants you to key them into his new client report. By 5:00 pm. For a moment, you wonder if life in prison without parole would be so bad after all. What now?

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Circle 262 on reader service card.

Help: Buying Smarter

Dropping a Line in the Data Age

As you board the airplane to go to your fifth country in as many days, you're beginning to wonder if there's a better way. Maybe you could have resolved all the kinks in these deals over the phone. Maybe you could have just sent faxes. Or used a videoconferencing system. Whatever the alternative, it has to be better than a rash decision to rough up the friendly skies.

Once a college class and now an entire curriculum, communications technology has a line on everything from whispered intimacies of royal passion to worldwide broadcasts of royal indiscretion—and all the backstabbing and sniping in between. In business, communication needs are equally diverse, even within a single project.

How you communicate boils down to three scenarios: One-on-one conversations to share ideas and understanding; one-to-many broadcasts—the classic presentation—to brainwash the unwashed masses; and many-to-one researches to gather overviews, opinions, and data.

No matter which of these scenarios best describes your business needs, all modern electronic communication is merely a substitute for the face-to-face meeting.

There's a laundry list of technologies that allow everything from interactive conversations to the exchange of images and other data. Major means of modern communication—the telephone (along with voice mail and teleconferences), paper-based mail and courier services, electronic mail, facsimile, modems, electronic white boards, and videoconferencing—each have their pros and cons.

Hello, Watson? The telephone was the first tool to bridge distance with interactive communication, but the phone alone can't reach across time differences. Projects get delayed by endless rounds of telephone tag (see "Cross-Continental Collaboration Requires Seeing and Agreeing with the Folks Down Under," at right). Worse, the phoned voice fades into the void as soon as it's spoken; words are forgotten, ideas lost.

Voice-mail systems are one solution to some of the weaknesses of the phone, but they're primarily intended to take a message, leading to telephone tag. If used properly, products like Boca Research's Complete Communicator line and Best Data Products' ACE 5000 (Advanced Communication Enhancement) will put an end to the tag game by answering your phone for you. Such products can provide callers with a menu of options to work through, giving them automated responses when possible and dumping them into voice mail only when necessary.

The telephone completely fails, though, in conveying visual expression—both the raised eyebrow and the sales chart. Putting a picture on the telephone with AT&T's VideoPhone 2500 or MCI's VideoPhone (made by GEC-Marconi) lets you see who's speaking, provided you have an ISDN line.

E-mail and Fax The primal means of moving data—be it written words or computer data on disk—is the letter carried by courier. The U.S. Postal Service delivers everything but a guarantee, while private couriers—Airborne, Federal Express, UPS,

SITE ANALYSIS CROSS-CONTINENTAL COLLABORATION

When Telstra, Australia's telephone company, wanted to roll out a new multimedia conference service, they called consultant Rich Barry, president of U. S.-based Creative Horizons, to help develop product, marketing plans, and release schedules. They had to cross several time zones, and deal with the logistics of a protracted long-distance review, revision, and approval process. The team needed Barry to generate proposals and the Telstra staff members to add their ideas.

In the past, the process—from draft to approval—took days. The problem wasn't slow decision-making but logistics. Ushering a single document through the process involved several rounds of intercontinental faxes, conference calls (and telephone tag), a lot of patience, and the possibility that the impersonal process masked significant individual concerns.

The Site Solution A new videophone technology coupled with application-sharing on Barry's PC cut the time needed for document approval to the length of a conversation, and trimmed down the expense to the cost of an ordinary overseas call. Using Comtech Labs' PC-Vone system, Barry could see his clients on the screen for an initial greeting, then fill the screen with his ideas while keeping his contacts' faces in a corner of the screen. Folks at both ends of the call could make changes in the text and see them reflected instantly. When the work was done, Barry could zoom in on his cohorts to see the real effects. He could maintain the connection on a standard analog telephone line to control expenses during everyday meetings. When high quality was needed, the PC-Vone could switch to an ISDN connection for more bandwidth and better video. See "How It Works" (page 241) for the two technologies our editors recommend to solve remote-collaboration problems.

and the like—correlate timely delivery with your willingness to pay. But physical mail forces you to face inevitable and possibly fatal delays. Although exploitable for postponing decisions and kiting checks, the delay of physical delivery adds days to making decisions needed in minutes.

Electronic mail replaces the human courier with the speed of light, delivering the message rather than the medium. Though most, like Lotus cc:Mail and Microsoft Mail are designed for networks, a gateway as simple as a modem unlocks the world. All you need to do is hook up to the Internet.

Just call an Internet service provider such as UUNET Technologies at (800) 488-6384 or Performance Systems International (PSI) at (800) 827-7482. Once you've established your Internet connection, you'll need the right software to help you navigate your way. Two of our favorites are NetManage's Internet Chameleon and The Pipeline's Internet for Windows.

While you're setting up your Internet connection to your e-mail system, try adding an e-mail-to-fax gateway to your corporate e-mail system. Or, if you don't need to send faxes from your e-mail package, try any number of stand-alone desktop fax packages that let you broadcast instant announcements almost anywhere. You'll just need a fax modem and some software.

Today the term *modem* is used almost universally to refer to a fax modem. You have your choice of hundreds, and with the V.34 standard upping performance levels to 28.8Kbps—equivalent to about three typewritten pages every second—you're looking at more applications for them every day. When we tested 28.8Kbps fax modems (see "The Best 200," June 1994, page 230), our top picks were the Supra SupraFaxModem 288 and the Microcom DeskPorte Fast due to their speed and affordability.

All Together Now Videoconferencing packages such as Comtech Labs' PC-Vone, Creative Labs' Sharevision PC3000, Future Labs TalkShow 3.0, and PictureTel's LIVE PCS 100 let you and your business pals cooperate interactively on drawings, blueprints, or package designs even if you're 3,000 miles apart.

By exploiting modern PC-based communications, you can give your new product—or any idea—the best possible chance of success. WINN L. ROSCH

WINN L. ROSCH *is a hardware guru and frequent contributor to* PC Computing.

HIT LIST COMMUNICATIONS

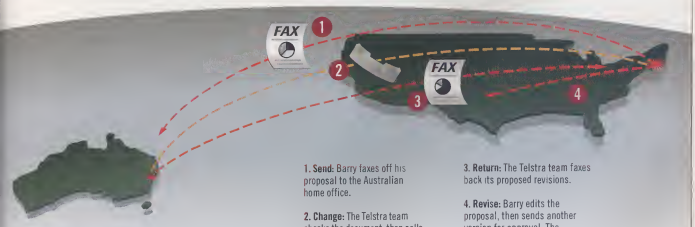
ET phoned home, but the telephone isn't always good enough for business.

1. Eschew voice mail. How many times have you deleted a voice-mail message unheard? Everybody else does it, too.
2. Avoid overnight mail. It's expensive and sometimes unreliable. When push comes to shove, electronics can do it better.
3. Use e-mail for day-to-day work. For short messages and transferring files, nothing beats a good, fast e-mail message.
4. Use videoconferencing to impress. Although the technology isn't perfect, using it can send a powerful message: "You're important enough that we're using high-tech."

REQUIRES **SEEING AND AGREEING** WITH THE FOLKS DOWN UNDER

The Problem

Long distance decision-making means a circular process extending over several days. Each proposed change requires one or more phone calls. Phone tag extends the acceptance process for days.



1. Send: Barry faxes off his proposal to the Australian home office.

2. Change: The Telstra team checks the document, then calls Barry to discuss changes.

3. Return: The Telstra team faxes back its proposed revisions.

4. Revise: Barry edits the proposal, then sends another version for approval. The cycle continues.

PRESENTING INTERACTIVE REMOTE DATA

Videoconferencing Is Virtual Face-to-Face

Two of the most intriguing solutions to the long-distance communication problem are shared whiteboards and PC-based videoconferencing. They address two slightly different problems. With a shared whiteboard, your data and your voice travel over a phone line to someone else who can comment, edit, and give you feedback. That's fine if you have an existing relationship with that person, but for breaking the ice, there's no more impressive way to say you care (short of flying them in) than videoconferencing—provided the recipient has access to compatible equipment. Here's how these two systems work (and sometimes don't work).

Whiteboard Systems A whiteboard is a notepad for group-think: Bring a conference together and sketch out your ideas in washable ink on a big white board for all to admire, edit, and ridicule. The electronic whiteboard lets you take the same approach beyond a single physical location so that two or more groups can discuss a project and see the sketches. Whiteboard software is useful for broadcast meetings, such as remote presentations, educational seminars, and other applications that require one person to broadcast slides to an audience.

Whiteboarding itself isn't a single technology—it borrows from several classic applications. Voice communication technology started with the telephone. Remote software has long given PCs the ability to synchronize programs running at remote sites, even drawing software. Mix voice communication and remote software together—often with dial-up video, which combines digital telephony with heavy-duty data compression to fit—and you get application sharing. Add a bit of PC whiteboard software or, better yet, a big screen such as an LCD panel or projection television, and you get a true whiteboarding system that can stand up in front of the most critical committee.

The big trick in whiteboarding is to send two signals (voice and data) on one wire—an admittedly poor wire at that. Fortunately, two companies, Radish Communications Systems and AT&T Paradyne, have devised methods of shoehorning voice and data together on a single phone line. The general name for this technology is simultaneous voice and data (SVD). The data in SVD can be anything—for example, ASCII text, software commands, a graphic image, an executable program file, or compressed video.

VoiceView, developed by Radish in 1992 as a proprietary product, was released as an open SVD protocol a year later. It has quickly gained support from major modem makers such as AT&T, Hayes, Rockwell, and U.S. Robotics, as well as Intel and Microsoft, because it can be grafted into standard communications chip sets while adding relatively little—less than $50—to the cost of a conventional modem.

To tell the whole story, VoiceView is a mode-switching system that only simulates true SVD. As you switch from describing (using your voice) to actually working (with data), it quickly and inaudibly toggles between sending voice and data without altering the actual signals. When you talk, VoiceView simply steals most of the line from your data. Voice takes priority and your voice stays analog while your data stays digital.

On the other hand, the VoiceSpan system developed by AT&T Paradyne works as a packet-based multiplex system. VoiceSpan converts your voice into digital form, and organizes the bytes of your voice and data into individual fixed-length packets. The mix of packets depends on what you do and say during a call. When you don't speak, VoiceSpan fills the line with data packets. Speak up, and it mixes in voice packets. As a result, data transmission slows as the stream of data packets gets diluted by voice packets. Even when you talk, however, some data always gets through.

Neither VoiceView nor VoiceSpan increases the data capacity of a telephone

Show or Tell: Videoconferencing, fodder for many a science-fiction book, may be too overwhelming financially or technologically. It requires ISDN lines and hardware you may not currently have. If your means are modest, or if you just want to send an FYI-type memo, good old-fashioned e-mail still does a fine job of transporting your documents to their target audience.

PICKS THE BEST **COMMUNICATION** TECHNOLOGY

1 Purpose of communication:	2 You also want . . .	3 This is the best solution for your needs:
Presentation	To Avoid Travel	Videoconferencing
	Personal Touch	Face-to-Face (Pack Those Bags)
Discussion	Least Expensive	Phone, E-mail, and Fax
	To Include Visuals	Videoconferencing
Document Modification	To Keep an Audit Trail	Fax or E-mail
	Real Time	Whiteboard (Videoconferencing Optional)

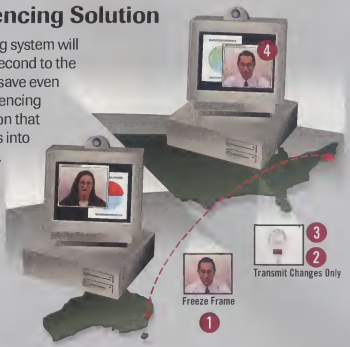
The Videoconferencing Solution

Generally, a videoconferencing system will send only 5 to 15 frames per second to the screen to save bandwidth. To save even more bandwidth, videoconferencing systems use video compression that can fit multimegahertz signals into 3kHz of telephone bandwidth.

1. Freeze: An initial frame is frozen, analyzed, compressed, and sent to the screen in its entirety to provide a baseline for future frames.

2. Change: During subsequent frames, when part of the image changes, only that part is analyzed and redrawn.

3. Discard: Videoconferencing systems use lossy compression. Within each frame, areas are analyzed, and unnoticeable (or barely noticeable) details are discarded.



Pro: The next best thing to face-to-face.

Con: Expensive, jerky motion and poor picture quality. Requires special phone lines, such as ISDN or leased lines.

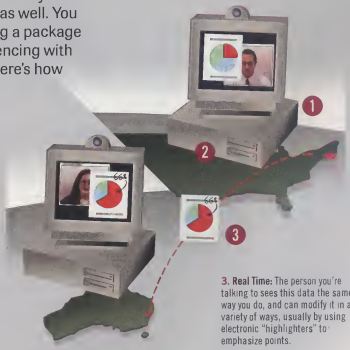
4. Send: Image data is encoded and packetized. The resulting data stream then undergoes conventional compression such as the Lempel-Ziv dictionary-based system. To view the image, the process is reversed using decompression. Quality varies according to compression ratio.

The Electronic Whiteboard Solution

There are times when it's not enough to see your comrade's smiling face—you've got to exchange some data as well. You can accomplish this by using a package that combines videoconferencing with an electronic whiteboard. Here's how the process works.

1. Connect: You link to the remote site over a high-speed line (standard phone hookups are too slow) like ISDN or switched-56Kbps.

2. Talk and Draw: As you talk and move around, you can place data into a "whiteboard" area—an area of memory that your computer shares with the remote one.



3. Real Time: The person you're talking to sees this data the same way you do, and can modify it in a variety of ways, usually by using electronic "highlighters" to emphasize points.

Pro: Participating parties can implement changes in real time. Works over standard phone lines.

Con: If you want to talk at the same time, you need a second phone line or a special voice/data modem.

BY WINN L. ROSCH

line. Because of the severe bandwidth constraints of a dial-up connection, whiteboarding software delivers adequate performance only by minimizing the data that it must move. For example, when it needs to update a screen, it sends out commands instead of hauling full-screen images through the narrow telephone channel. Because the same application software runs at each end of the whiteboard connection, each responds identically to the shared commands. All the screens in the whiteboard connection always look the same, no matter who draws on them.

Videophone and Compression Fitting a face where only a voice should go is today's top challenge for image-processing engineers. The telephone system provides a ready and inexpensive communication channel that reaches anywhere on earth. Video images provide you with the best possible alternative to the in-person meeting—face-to-face reading of expressions and body language.

The problem is that conventional video images were designed around a 6MHz communication channel, while telephones are limited to a bandwidth of about 3,000Hz, one two-thousandth the size used for television. So all dial-up video systems make heavy use of digital image compression.

Unlike normal data compression used in file archiving and data transfer across modems, most video compression systems are *lossy*—that is, part of the image information is discarded to reduce its size. The trick is to throw away only things that no one will see or notice. The more you throw away, the less data you need, but the more obvious the omissions become, typically showing up as blockiness or streaky ghosts in the display. Success depends on the loss of quality you'll tolerate.

Modern video compression algorithms mix together several technologies to achieve compression ratios of hundreds to one (compared with the nominal two-to-one average compression ratio of systems that don't use lossy compression).

Before compression begins, however, videophone systems give their engineers a head start by keeping image resolution low. Most videophone systems display images that measure only 160 by 120 pixels, which trims image data to one-sixteenth that required by a 640-by-480 pixel VGA image.

Video vs. Data Compression Normal still-image compression programs work two-dimensionally. They analyze areas. For example, JPEG compression (the acronym stands for the Joint Photographic Experts Group, which developed the standard) evaluates an eight-pixel square area, eliminating frequencies too high to observe, and encoding it as a pattern of bytes. JPEG compression also reduces color according to a sliding scale keyed to the compression ratio. The resulting data stream then gets standard Lempel-Ziv data compression.

Video compression works three-dimensionally—in addition to working over areas, it works in real time. It takes advantage of how little actually changes from frame to frame in a video image. Only the changes get stored or transmitted; the static parts of the image can be ignored. For example, when someone moves against a backdrop, only the pixels in the moving character need to be relayed to the data stream.

This system has one inherent problem. Any noise, distortion, or mistransmission in one frame gets multiplied through all those that come after. To minimize such effects, most video compression systems periodically update the entire image.

One further way to reduce the amount of video sent over the wire is simply to cut the frame rate, and most videophone systems use this technique. To maintain the illusion of smooth motion, they don't simply drop frames but tie the frame rate to image movement, minimizing visible jerkiness of the image. Most videophone systems achieve frame rates of 5 to 15 frames per second (fps).

The One for You Right now, videoconferencing systems are considerably more expensive than simple shared whiteboard systems. The bang for the buck isn't all that much greater most of the time, either. Given these two facts and the generally low resolution of PC-based videoconferencing, we see shared whiteboards as far more useful—for now. Take one for a test spin.

WINN L. ROSCH

BUYER'S GUIDE WORKGROUP COMMUNICATION

A Little Means a Little: Spend $100 and you exchange simple data. Spend $6,000 and you exchange whatever you want.

	Data	Voice	Video	Price
cc:Mail Desktop for DOS (V4.0) Lotus Development (800) 448-2500 *Reader Service No. 809*	✓			$95 (per user)
LIVE PCS 100 PictureTel (800) 716-6000 *Reader Service No. 810*	✓	✓	✓	$5,995
Sharevision PC3000 Creative Labs (800) 998-1000 *Reader Service No. 811*		✓	✓	$1,599
VideoPhone 2500 AT&T (800) 437-9504 *Reader Service No. 812*		✓	✓	$995
VoiceView Radish Communications Systems (800) 723-4748 *Reader Service No. 813*	✓	✓		$595
WinFax Pro Delrina (800) 268-6082 *Reader Service No. 814*	✓			$129

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VOICE MAIL AND VIDEOCONFERENCING ARE SURE BETS

Feasibility vs. Information SuperHype

PC communication? Five years from now, we won't use the term. That's because PC communication is becoming enterprise communication. Microprocessors are turning up in everything from mainframes and minicomputers to PBXs, bridges, routers, and workstations. As we tie PCs together, we are solving communication problems for individuals—and the entire business. We justify PC communication by showing its ability to improve relations among people.

Look at PC communications products and some low-tech alternatives, and consider where we should invest money this year and where we should sit tight. "Which Communication Methods Are Cost-Effective" below, shows the cost vs. productivity of several communication choices.

What Are You Waiting For? It's true confession time. When I got voice mail in 1988, I wasn't that impressed. I thought e-mail was more than adequate and besides, I hated answering machines.

But voice mail is terrific. It's almost free and soon it's coming to your PC. The hard part is convincing Neanderthals that it's OK to capture a call electronically instead of having an assistant put it on paper. And who wants to fool with retrieving e-mail while traveling? Voice mail is a faster and better medium.

Bucks and Guts The picture phone is an ROI trap. Why invest in a dedicated screen for the phone when we have a better quality screen available with our PC? In the future, the PC will absorb voice applications. Heck, even the PBX is just an expensive PC.

The face-to-face meeting is the all-time, low-tech champ. Ignore the videoconference geeks. Face-to-face meetings are a necessary part of business. Technology will not replace them—completely—any time soon. We need eye-to-eye, handshaking exchanges for initial business contacts, closing deals, and bonding.

On the other hand, videoconferencing is a terrific alternative for less strategic meetings. It's easy to cost justify.

Last week, I held a videoconference with a vendor in California who was competing against a local vendor in New Jersey. The California folks got my business, in part, because video mollifies the distance problem. My application development team can hold review meetings without hopping on a plane.

The math is easy. Conference-room video is a real ROI champ. On the other hand, desktop video will be experimental this year. Desktop whiteboarding is a good first step and much less expensive.

Facsimile has taken a bite out of the overnight courier market, but an overnight delivery still dazzles customers. It remains a mainstream tool for business.

Credibility Sinks Cellular modems are going to be hot—someday. For 1995, they are dogs. You know how difficult it can be to establish and maintain a cellular voice connection? Imagine how much fun it will be with cellular data. You can afford to lose your connection when you talk to your boss, but you can't risk transmitting files over flaky lines. Got money to burn? Fine. But forget about the ROI in 1995. This is strictly a work in progress.

The Internet is hot. But take a close look at what many people are doing with the Internet. They browse the Net aimlessly, with no specific business activity in mind. Random access to unlimited information translates into garbage.

Smart companies are using the Internet as the data equivalent of the telephone. It provides a quick, easy way to talk with customers and vendors—provided security doesn't matter. Beyond that, the Internet is also a work in progress.

Gimme a Break Snail mail is for companies with non-mission-critical routines. Would you send an important document via the U.S. Postal Service? Only when it absolutely, positively doesn't have to be there soon. Unfortunately, it's not great for serving customers. MARC DODGE

MARC DODGE, *a telecommunications department manager, is a regular contributor to* PC Computing.

ROI WHICH COMMUNICATION METHODS ARE **COST EFFECTIVE?**

Phone and Fax: Spending a lot of money for high-powered videoconferencing hardware and software isn't necessarily the route to improving productivity—or keeping your job for long, for that matter.

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IT'S NOT IF. IT'S WHEN.

486, Pentium, PowerMac...

No matter how fast your PC is, it can't outrun a power problem

(Get Uninterruptible...starting at $119)

Just don't have the time for power problems on your PC? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes.

IN THE NEXT THREE MONTHS, MORE THAN 30,000,000 PCs WILL BE HIT BY POWER PROBLEMS...

In fact, you have better odds of winning the lottery than of escaping the sting of power problems on your PC. One study discovered a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse. And since sags and blackouts represent more than 85% of power problems likely to hit your computer, standard surge suppressors are literally powerless to protect you. And a study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined.

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APC Uninterruptible Power Supplies provide instant battery backup to protect your data from loss and your hard drive from damage. Units are even backed by up to $25,000 in lifetime surge protection insurance.

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Carol Irvine, Wizard Assoc.

"We reduced our maintenance costs the first year by 30% in repairs of equipment."
Valentin Gonzalez, Pfizer

"Our server was running a project when it lost power... messed up all the data files. It took four days to recover. But we don't worry anymore since we got APC..."
Tony Chen, DeAnza Systems

"We were working on a state bid when the power went off. APC saved the day and year and future...about 800 pages of data saved thanks to APC."
Ravi Iyer, Software Galleria

"A power surge did significant damage to all of our systems except those protected by APC. The APC units were undamaged..."
C. Jeffrey, C. Jeffrey Eng.

"APC has virtually eliminated downtime in our corporate network..."
Kurt Roemer, Searle Corp.

"Power went out while processing payroll! If not for APC we would have had a walkout!"
Suzi Higgason, OSI Inc

Home office user Don Truax knows first hand about APC reliability. "It ought to be against the law to buy a computer without an APC Back-UPS 250. I recently had a direct lightning hit right outside the house...my computer never blinked."

"APC lets me sleep better at night. How much would you pay to get back that one file you worked all day to complete for the boss who gets on the plane at 8:00 a.m? You should assume that you'll buy a UPS, not that it's some luxury item."
R. Morello, Westinghouse

"A power surge wiped out the FAT tables on all PC's not protected by APC. Now have APC installed on all..."
Craig Post, Comm. Tech.

"Before I purchased the UPS I had to put in at least two hard drives at $1000. With APC products...no new hard drives in two years!"
S. Foreman, LSP

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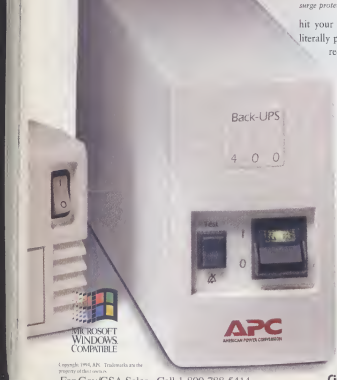

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SPEC WATCH Portable Computers

Lean and Mean If you need a do-it-all notebook with a docking station or a light-weight subnotebook for note-taking on the road, Marty Jerome has some good advice for you. His portable-purchasing pointers include how to find the right processor for your needs, the way to select the best display, and what to look for in a keyboard. **251**

Spec Watch Before your next hardware investment, check out our recommended specs:

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Your Guide to Buying DIRECT

Empowered Buyers Buy Direct

Buying direct has many advantages. You can call a number of vendors, compare products, prices, service and support — all through the pages of PC Computing. Direct vendors offer mainstream products at competitive prices. Warranties and service contracts eliminate the fact that a company may be located a few states away. And shipping can be virtually instantaneous.

What do you need to know to buy direct? PC Computing gives you a wealth of timely and relevant information on the latest techologies and products, on how products will effect your productivity and on choosing a product and brand to purchase. If you have questions, direct vendors welcome the opportunity to answer them. Consider your call to the vendors appearing in these pages a consultation session, where salespeople and telemarketers advise you on products that best meet your specific computing needs.

The bottom line is that you never have to buy until all of your questions are answered, your needs are met and your concerns addressed. Many PC Computing readers reach this state every month — which has resulted in this robust and vital section.

This new page in our Direct to You section is a tool for direct shoppers to call out some highlights from a few of the ads in the the section. We hope it helps you navagate Direct to You and inspires you to call.

Parlez Vouz Quantex?

Where can you get servality, priceformance and vundle? When you speak the language of Quantex, they're all easy to find. "Servality" is great service coupled with top quality. "Priceformance" is the perfect combination of great price and excellent performance. "Vundle" is real value in CD bundles. And when you are speaking Quantex, value and benefit are words everyone understands. Turn to page 265 for Quantex's full selection of multimedia systems, vundled software and more,or call them at 1-800-787-8686.

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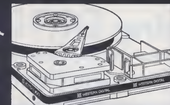
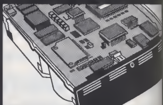
Pick a Pentium, any Pentium. MidWest Micro offers a full range of Pentium offerings, everything from 60MHz to 100MHz. At $2,999, the P5-90 comes with 16MB of RAM and a 15-inch SVGA.28 digital color monitor. For $3,499 the P5-90 offers 16MB of RAM and a 17-inch.28 digital color monitor. Don't see what you want? Call MidWest Micro at 1-800-682-7248 (systems) or 1-800-445-2035 (peripherals) and let them help you configure your ideal system. Their ad appears on page 256.

Enter the Age of the Laptop with Sager

Access CD libraries and applications, watch movies or play stereo CDs — all from your laptop! With an internal CD-ROM drive from Sager, the same power as your desktop is available in a portable. With an optional TV-tuner module, turn your notebook into a TV or edit videos with NTSC/PAL or composite video input. Sager's NP9500 features an internal 5 1/4-inch dual-speed CD-ROM drive (optional), 256KB secondary cache and four PCMCIA Type II slots for workstation power. And Sager's NP7500 local bus notebook quotes speeds 45 percent faster than other notebooks. For your next notebook purchase, call the portable power people at Sager at 1-800-669-1624. See their ad on page 274.





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During the first year of your warranty, we replace: not repair, any defective items. All items receive lifetime technical support from our factory trained techs.

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#1 IDE drives. 3 year warranty, read/write cache.

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2147MB	8ms	7200rpm	ST32550N	$1119
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JAPANESE QUALITY! INCREDIBLE PRICE!

530MB	3.5"	13.8ms	IDE	2yr wty.	$214
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420MB	CONNER	2yr	$187	$339
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6 Disc	Double Speed	DRM602X	$399
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HARD DRIVES

CONNER

IDE			
210MB	14ms	CFS210A	$164
420MB	14ms	CFS420A	$198
850MB	10ms	CNR850A	$359
1275MB	9ms	CNR1275A	$539

Maxtor

IDE			
135MB	12ms	M7135AV	$139
420MB	12ms	M7420AV	$195
540MB	12ms	M7540AV	$235
853MB	12ms	M7850AV	$399
1260MB	12ms	M71260AV	$485

MICROPOLIS

SCSI			
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3020MB	11ms	MC1936	$1199
4294MB	8ms	MC3243	$2029
9100MB	12ms	MC1991	$3199
SCSI-AV Audio / Visual tuned drives			
2000MB	8.5ms	MC4221AV	$1179
3000MB	11ms	MC1936AV	$1545
4294MB	8ms	MC3243AV	$2179
9100MB	12ms	MC1991AV	$3439

Seagate

IDE			
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420MB	14ms	ST3491A	$199
545MB	14ms	ST3660A	$229
722MB	12ms	ST3780A	$309
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2148MB	9ms	ST12400N	$979
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4290MB	8ms	ST15150N	$2189
9080MB	11ms	ST410800N	$3299

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541MB	11ms	LT540S	$248
731MB	11ms	LT730S	$295
1080MB	10ms	IMP1080	$525
2160MB	9.5ms	IMP2160S	$899
4280MB	8.6ms	GP4280S	$2099

SYQUEST

SCSI		Drive	PC Kit	Mac Kit
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200MB	SQ5200C	$389	$549	$519
270MB	SQ3270S	$369	$519	$489
IDE		Drive	PC Kit	Portable
105MB	SQ3105A	$179	$269	$339
270MB	SQ3270A	$339	$439	$529

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44MB 66/61/57 88MB 70/66/64 105MB 56/54/53
200MB 83/77/75 270MB 65/62/59

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Sanyo	SH93R	2X	280ms	$149
IDE (ATAPI)				
Mitsumi	CRMCFX400	4X	230ms	$225

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SB= Sound Blaster 16 SCSI. SA= Sound Blaster SCSI ASP.

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Multiple drives in a single enclosure.

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Kit includes 16bit card, DOS or Windows software & 1 tape.

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2Gig	Conner	4320	$779	$879
2Gig	HP	35470	$759	$859
NEW DRIVE! Back-up speed 54MB/min				
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4-8Gig	HP	35480	$869	$969
4-10Gig	Conner	4326	$959	$1089
4-10Gig	HP	C1533A	$1049	$1169
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Boost Performance 30 to 80%! VESA coming soon.		
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WEIGHT OR MUSCLE—YOU DECIDE

Portable PCs: You Can Take 'Em with You

To many old road warriors, the term *portable PC* still evokes a legacy of compromise—small, dim displays; cramped keyboards; tiny hard drives. Yet many of today's high-end portables cast an embarrassing shadow on your desktop system's power, usability, and features. In fact, with the advent of docking stations, many portable computers *are* desktop systems as businesspeople eschew the hassle and expense of maintaining two or more PCs. The key question is: How much travel will it see? If you just type memos, patch spreadsheets, and fetch e-mail, a four-pound subnotebook will serve you well. With more rigorous computing, you'll need greater power—and, unfortunately, more heft.

Don't settle for anything less than a 33MHz 486 CPU, 8MB of RAM, and a 120MB hard drive. Pentium-powered units and 800MB hard drives are already here. As for RAM, better notebooks let you upgrade memory yourself.

Monochrome displays are dead. Graphical environments simply demand color. Dual-scan passive-matrix displays cost only a fraction more than monochrome displays, consume no more battery life, and will save you a fortune in aspirin. For multimedia, business presentations, desktop publishing, and high-end graphics, you'll want active-matrix technology. It adds $700 or more to the cost and about a pound of weight.

Make sure the display measures at least 9.5 inches diagonally on a notebook, at least 8.5 inches on a subnotebook. All portables should come with a VGA port for connecting an external monitor—with simultaneous display. Better models support SVGA on a monitor and 256 colors at 640-by-480 pixel resolution on LCDs.

Your keyboard's cursor controls should be at least half the size of QWERTY keys and should reside in their customary "inverted T" position. And function keys should be adequately sized, and well spaced so you don't confuse them. Also, check the Alt and Ctrl positioning.

Aside from docking stations, PC Card slots provide the best expansion option. Look for at least two Type II slots (or one Type III slot) on full-sized notebooks. Subnotebooks should have at least one Type II slot. MARTY JEROME

PORTABLE PCs COLOR RULES AT LESS THAN SEVEN POUNDS

USABILITY

A. Display: 9.5-inch active-matrix or dual-scan passive-matrix color display.
B. Display: 7.5-inch or larger dual-scan passive- or active-matrix color display.
C. Weight: Total traveling weight less than 12 pounds.
D. Weight: Total traveling weight less than 7 pounds.
E. Key Spacing: Cursor controls and function keys at least half the size of QWERTY keys.
F. Batteries: Swappable without powering down.
G. Battery Life: At least 4 hours with power management set at half mast.

FEATURES

1. **RAM:** Expandable to at least 20MB.
2. **Slots:** Two Type II (or one Type III) PC Card.
3. **Slots:** At least one Type II PC Card.
4. **Ports:** Parallel, serial, VGA, PS/2, mouse, and keyboard.
5. **Sound:** Integrated sound chip.

DECISION MAKER

	1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Desktop Use		Multimedia, Application Development, Graphics	75MHz DX4, 16MB of RAM, 500MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4, 5
		Word Processing and/or Spreadsheets	50MHz 486DX2, 8MB of RAM, 250MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
Traveling Machine		Presentations, Communications	50MHz 486DX2, 8MB of RAM, 170MB Hard Drive	Usability: A, C, E, F, G Features: 1, 2, 4
		Word Processing, Spreadsheets, Databases	33MHz 486, 8MB of RAM, 120MB Hard Drive	Usability: B, C, E, F, G Features: 1, 4

Direct to You SPEC WATCH: Don't Settle for Less than These Specs

DESKTOP SYSTEMS

WHETHER A 486 OR PENTIUM, **STOCK WITH RAM**

USABILITY

A. BIOS: Flash BIOS for easy upgrade.
B. Case: Tool-free cover removal.
C. CPU: ZIF CPU socket.
D. RAM: Easy access to SIMMs.
E. Hard Drive: Enhanced IDE.

FEATURES

1. **CPU:** 256K cache, upgradable to Pentium.
2. **RAM:** Expandable to 32MB.
3. **Monitor:** 17-inch.
4. **Monitor:** 21-inch.
5. **Video:** 64-bit VL-bus or PCI accelerator with 2MB of RAM.
6. **Video:** 64-bit VL-bus or PCI accelerator with 4MB of RAM.
7. **Hard Drive:** Enhanced IDE or SCSI-2.
8. **Sound:** 16-bit sound card (Sound-Blaster–compatible).
9. **CD-ROM:** Dual-speed drive.
10. **Slots:** Three PCI or VL slots.
11. **Ports:** Two serial, one parallel, keyboard, mouse.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Text & Numbers	Word Processing & E-mail	66MHz 486DX, 8MB of RAM, 340MB Hard Disk, 15-inch Monitor	**Usability:** A, B, C, D, E **Features:** 5, 7, 8, 9, 10, 11
	Spreadsheets & Databases	100MHz 486DX4 or Pentium, 16MB of RAM, 500MB Hard Disk	**Usability:** A, B, C, D, E **Features:** 1, 2, 4, 6, 7, 8, 9, 10, 11
Graphics, Design & Multimedia	Presentations, Drawing & Flowcharting	66MHz 486DX2, 16MB of RAM, 500MB Hard Disk, 17-inch Monitor	**Usability:** A, B, C, D, E **Features:** 1, 2, 3, 6, 7, 8, 10, 11
	CAD, 3-D Rendering & Image Editing	100MHz 486DX4 or Pentium, 16MB of RAM, 1GB Hard Disk, 21-inch Monitor	**Usability:** A, B, C, D, E **Features:** 1, 2, 3, 6, 7, 8, 10, 11

LASER PRINTERS

LOOK FOR 4 TO 8 PAGES PER MINUTE AND **PCL 5**

USABILITY

A. Emulation Switching: Automatic, all ports active.
B. Paper Tray: 200-sheet or larger with envelope feed.
C. Cartridges: One or more HP-compatible cartridge slots.
D. Footprint: 260 square inches or less.
E. RAM: User-upgradable memory and interface.
F. Display: LED panel or software utility for paper jams, errors, and status.
G. Energy Use: Automatic sleep mode or EPA Energy Star compliance.

FEATURES

1. **Page Description:** PCL 5 emulation.
2. **CPU:** RISC.
3. **RAM:** 2MB.
4. **RAM:** 4MB or more.
5. **Fonts:** 35 or more resident (at least 10 TrueType).
6. **Fonts:** 45 or more resident (at least 10 TrueType).
7. **Interface:** Bidirectional parallel interface.

DECISION MAKER

1 What's more important?	2 How many pages per day?	3 This is a minimum configuration:	4 Look for these features...
Text & Simple Business Graphics	More than 20	8 ppm, PCL 5, 300 dpi or Higher	**Usability:** C, D, E, F, G **Features:** 2, 3, 5, 7
	20 or Fewer	4 ppm to 6 ppm, PCL 5, 300 dpi or Higher	**Usability:** B, C, D, E, F, G **Features:** 2, 3, 5, 7
Graphics-Laden Documents	More than 20	8 ppm, PostScript 600 dpi	**Usability:** A, B, C, D, E, F, G **Features:** 1, 3, 4, 5, 7
	20 or Fewer	4 ppm to 6 ppm, PostScript, 600 dpi	**Usability:** A, B, C, D, E, F, G **Features:** 1, 3, 4, 5, 7

GRAPHICS ACCELERATORS

GET YOURSELF A **VESA OR PCI** BUS CARD

USABILITY

A. Software: For changing resolutions and colors.
B. Software: For driver installation.
C. Extra: Virtual desktop support.
D. Jumpers and Switches: None.

FEATURES

1. **Drivers:** Windows 3.1.
2. **Memory:** Expandable to 2MB.
3. **Memory:** Expandable to 4MB.
4. **Memory:** Expandable to 6MB.
5. **Vertical Refresh:** 72Hz or higher at all resolutions.
6. **Number of Colors:** 64,000.
7. **Number of Colors:** 16.7 million (true color).
8. **Feature Connector:** VESA advanced feature connector (VAFC) or VESA media channel (VMC) feature connector.
9. **3-D Support:** OpenGL.
10. **Resolution:** 1,600 by 1,280 pixels at 16.7 million colors.
11. **DRAM:** 2MB minimum.
12. **VRAM:** 4MB minimum.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Text & Numbers	Word Processing & E-mail	800-by-600-Pixel Resolution at 256 Colors	**Usability:** A, B, D **Features:** 1, 2, 5
	Spreadsheets & Databases	1,024-by-768-Pixel Resolution at 256 Colors	**Usability:** A, B, C, D **Features:** 1, 3, 5, 6, 11
Graphics	Design & Multimedia	1,024-by-768-Pixel Resolution, 64-bit Accelerator	**Usability:** A, B, [illegible] **Features:** [illegible]
	CAD or Image Editing	1,280-by-1,024-Pixel Resolution, 64-bit Accelerator	**Usability:** A, B, [illegible] **Features:** [illegible]

MONITORS

SELECT THE **RIGHT SIZE** FOR YOUR APPLICATIONS

USABILITY

A. Controls: Front panel or onscreen digital.
B. Power Management: EPA Energy Star.
C. Base: Adjustable tilt and swivel.
D. Input: Multiple input sources.
E. Settings: Saved for different resolutions.

FEATURES

1. **Emissions:** MPR II.
2. **Tube:** Flat-square or Trinitron.
3. **Controls:** Microprocessor based.
4. **Controls:** Color.
5. **Coating:** Antiglare.
6. **Vertical Refresh:** At least 72Hz.
7. **Vertical Refresh:** At least 76Hz.
8. **Vertical Refresh:** At least 84Hz.

DECISION MAKER

1 What's more important?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Text & Numbers	Word Processing & E-mail	15-inch, 800-by-600-Pixel Resolution, 0.28mm Dot Pitch	**Usability:** A, B, C, E **Features:** 1, 2, 3, 5, 6
	Spreadsheets & Databases	17-inch, 1,024-by-768-Pixel Resolution, 0.28mm Dot Pitch	**Usability:** A, B, C, D, E **Features:** 1, 2, 3, 5, 6
Graphics, Design & Multimedia	Presentations or Drawing	21-inch, 1,280-by-1,024-Pixel Resolution, 0.31mm Dot Pitch	**Usability:** A, B, [illegible] **Features:** [illegible]
	CAD or Page Layout	21-inch 1,600-by-1,280-Pixel Resolution, 0.31mm Dot Pitch	**Usability:** A, B, C, D, E **Features:** [illegible]

MODEMS

FOCUS ON 14.4KBPS AND **FAX** FEATURES

USABILITY

A. Display: LCD Display on external models.
B. Compatibility: Fallback transmission rates.
C. Compatibility: DOS and Windows communication software supports Zmodem, Ymodem, Xmodem, Kermit, CompuServe B Plus, and CompuServe Quick B protocols.
D. Software: Fax supports OCR.
E. Installation: Interrupts on internal faxes set through software.
F. Port Selection: COM1 through COM4.

FEATURES

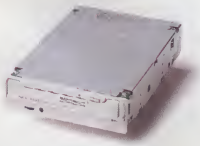
1. **Compatibility:** V.32 bis, V.42 bis, CCITT group 3 Class 1, Class 2, CAS, Hayes command set.
2. **Audio:** Integrated voice, data, and fax.
3. **DSP:** Onboard digital signal processor.
4. **Speed:** 16550 UART.

DECISION MAKER

1 Time spent online?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
Six Hours or More per Week	PC-to-Network File Transfer	14.4Kbps with Fax, V.Fast Class (V.34)	Usability: A, B, C, D, E, F Features: 1, 2, 3
	Read Text Online, E-mail	9,600 bps with Fax	Usability: A, B, C, D, E, F Features: 3
Fewer than Six Hours per Week	Download Files	14.4Kbps with Fax	Usability: A, B, C, D, E, F Features: [illegible]
	Read Text Online, E-mail	9,600 bps (Fax Optional)	Usability: A, B, C, [illegible] (optional), E, F Features: 1, 4

CD-ROM DRIVES

DEMAND DUAL- OR QUAD-SPEED AND **MPC 2** COMPATIBILITY



USABILITY

A. Door Cover: Double doors on drive to deter dust.
B. Control: Output jack and manual volume control.
C. Installation: IRQs set through software, not jumpers or dip switches.

FEATURES

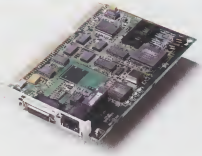
1. **Performance:** 200ms access time or faster.
2. **Interface:** SCSI-2.
3. **Buffer:** 64K or larger.
4. **Buffer:** 256K or larger.
5. **Compatibility:** MPC 2.
6. **Compatibility:** High Sierra and ISO-9660.
7. **Compatibility:** CD-Audio and Kodak Photo CD.
8. **Applications:** Bundled CDs.

DECISION MAKER

1 What's more important?	2 On what range of CDs?	3 This is a minimum configuration:	4 Look for these features...
Multimedia	5 or More Commercial Titles	Quad-speed Drive with 150Kbps to 600Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
	Proprietary, or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 4, 5, 6, 7, 8
Text & Static Images	5 or More Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: [illegible]
	Proprietary or Fewer than 5 Commercial Titles	Dual-speed Drive with 150Kbps to 300Kbps Transfer Rate	Usability: A, B, C Features: 1, 2, 3, 5, 6, 7

ETHERNET CARDS

PICK THE ONE THAT **SERVES YOUR NETWORK** NEEDS



USABILITY

A. **Software:** Diagnostic utilities.
B. **PROM:** Flash upgradable.
C. **Configuration:** Through software (no jumpers or switches).
D. **Virus Protection:** Integrated PROM.
E. **LEDs:** Transmission and reception.

FEATURES

1. **Drivers:** NE2000-compatible.
2. **Network Management:** SNMP support.
3. **Bus Mastering:** Yes
4. **Extra:** Full-Duplex Ethernet support.
5. **Cache/Buffer:** 16K or larger.
6. **Bus Support:** PCI, VL, or EISA.
7. **DS Support:** NetWare, Windows NT, Windows for Workgroups, and OS/2.

DECISION MAKER

1 What's more important?	2 What will you use it for?	3 This is a minimum configuration:	4 Look for these features...
Workstation	File Services	16-bit	Usability: A, B, C, D Features: 1, 2, 7
Workstation	Application Services	16-bit Bus Mastering	Usability: A, B, C, D Features: 1, 2, 5, 7
File Server	20 Nodes or Fewer	16-bit Bus Mastering	Usability: A, B, C, E Features: 1, 2, 3, 4, 5, 6, 7
File Server	More than 20 Nodes	32-bit Bus Mastering	Usability: A, B, C, E Features: 1, 2, 3, 4, 7, 8, 9

NETWORK SERVERS

THE **PENTIUM** IS STANDARD EQUIPMENT FOR MOST SERVERS

USABILITY

A. **BIDS:** Flash for easy upgrades.
B. **Enclosure:** Tool-free removal.
C. **CPU Socket:** ZIF.
D. **SIMMs:** Easily accessible.
E. **Drive Bays:** Easily accessible.

FEATURES

1. **CPU Cache:** Expandable to 1MB.
2. **Upgrade Potential:** Pentium upgradable.
3. **Interface:** Wide SCSI-2.
4. **RAID:** Level 3 or 5.
5. **RAM:** Expandable to 128MB.
6. **Bus Slots:** Eight EISA with two VL or PCI.
7. **Internal Bays:** Two full-height 5¼-inch, two 3½-inch.
8. **External Bays:** Two half-height 5¼-inch with front-panel access.
9. **Backup:** DAT.
10. **Network Card:** One 16-bit.
11. **Network Cards:** Two 16-bit.
12. **Protection:** UPS.

DECISION MAKER

1 How big is your network?	2 Primary activity?	3 This is a minimum configuration:	4 Look for these features...
20 or Fewer Clients	File Storage	66MHz 486DX2, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 2, 5, 6, 7, 9, 10, 12
20 or Fewer Clients	Application Services	60MHz Pentium, 16MB of RAM, 1GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 9, 10, 12
21 or More Clients	File Storage	60MHz Pentium, 32MB of RAM, 2GB Hard Disk	Usability: A, B, C, D, E Features: 1, 3, 4, 5, 6, 7, 8, 9, 11, 12
21 or More Clients	Application Services	90MHz Pentium, 64MB of RAM, 4GB Hard Disk, RAID Level 5	Usability: A, B, C, D, E Features: 1, 3, 5, 6, 7, 8, 9, 11, 12

Elite Pentium™ Processor
The Power Is Building

The excitement is building... and so is MidWest Micro. In fact, we've been building for quite some time. Not just a line of Elite Computer Systems—but a reputation for quality and value. And now we'd like to invite you to watch. Welcome to one of our works in progress—Elite Pentium™ Processor Based Systems.

Zoned For 100 MHz

When our developers first considered a Pentium project, they started by gathering the proper materials. And of course the raw power of Intel's Pentium processor was the very first item on everyone's list. In fact, this Elite line was designed to include four different levels of Pentium power—giving you P5-60, P5-75, P5-90 and P5-100 Systems to choose from. And in case the CD-ROM drives, fax modems and other extras built into these Elite PCs aren't enough to rattle your rafters, we've got plenty of add-ons in our product line for endless Pentium possibilities.

Based Systems...

Opening Doors Of Communication

We've gotta hand it to those MidWest architects. With PCI framework built into every Pentium Processor Based Elite, you'll reach the maximum capacity in all your applications. That's because PCI Local Bus technology moves data across wide 32-bit beams—giving you quick access to your peripherals and hard drive. And when you combine PCI with the Intel Pentium chip, overall performance simply goes through the roof!

Hats Off To More Software

You don't need a hard hat to inspect this part of your Elite PC. Dwelling inside each Elite Pentium Processor Based System is a bundle of exciting multimedia software. And with Microsoft® titles like MS® Office Professional, Encarta™, Money, Bookshelf® '94 and Dangerous Creatures at your fingertips, you'll have no trouble finishing the daily projects *you* undertake.

Call your MidWest contractor today and we'll build an Elite Pentium Processor Based System just right for *your* lot.

ALL SYSTEMS NOW
PCI
Get out your measuring tape —here's something that might surprise you. Perfect for your home *or* workshop, the mini-tower case shown here is equipped with three 5.25" and two 3.5" drive bays— but it still maintains compact dimensions of 15" high by 6.5" wide. MidWest Micro believes in expanding your *options*...not the size of your computer.

Plug Into PCI

Tired of PCs that are too much like work? Then get ready for pure high-tech electricity. Elite PCI Systems combine advanced PCI Local Bus technology with powerful Intel® processors — giving you access to a new brand of power tools…

Safety Goggles Optional

The 32-bit current running through every Elite PCI System delivers high-voltage video and shocking peripheral performance. We're talking an information flow of up to 132 Mbps! And even though MidWest Micro practically overloads your computer with extras like fax modems, CD-ROM drives and graphic accelerators, you never have to worry about blowing a fuse — PCI technology supports up to 10 peripherals without so much as a short in the system.

Go Ahead, Try This At Home

The only danger involved in owning an Elite Home PC, is never wanting to leave the house again. These PCI Systems come wired with double speed CD-ROM drives and multimedia bundles your entire crew will enjoy. And with Intel486™ and Pentium™ processors to choose from, you're sure to find a Home PC with just the right wattage for your household projects.

Watch The Sparks Fly

If what you need is an outlet for speed, check out MidWest's DX4 PCI Systems. These Elite PCs come with powerful IntelDX4 motors for processing speeds up to 100 MHz! You won't find a faster 486 system…in anyone's toolbox!

No matter which Elite power tool you choose, you'll always have a handle on high performance. Call MidWest Micro today and get ready for a PCI power surge!

intel inside

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248
Peripherals
1-800-445-2035

AD#M02

The Elite SoundBook —An Exciting Breakthrough In Portable Computing

Life is full of little surprises. One minute you're climbing the ladder of success — the next minute your world is crashing down all around you. So in order to be prepared for *your* next surprise, make sure there's always an Elite SoundBook in your toolbox. This powerful 486 notebook comes with business audio features, Advanced Power Management and your choice of screen, hard drive and processor up to DX4-100 — but it still manages to weigh in at less than seven pounds. Why did we make the Elite SoundBook so small? Because sometimes you need to get *into* a tight spot... to get *out* of one.

Features That'll Floor You

No matter how your new Elite SoundBook is configured, you'll always enjoy crystal clear audio and video. And that's definitely a must when you're working in unfamiliar surroundings. The SoundBook's special software, microphone and speaker let this amazing notebook talk you through even the toughest projects — just in case your hands are full. And since MidWest knows you've got *enough* headaches, each SoundBook comes with a crisp 9.5" monochrome, 10.3" dual-scan color or 9.5" active-matrix color display that's perfect for hours of comfortable viewing. Plus, you'll never have to worry about extension cord safety — the SoundBook's nickel metal hydride battery keeps working until the job's done!

Dig Your Phone Out Of The Wreckage And Give Us A Call

If you still think a computer system has to be a permanent fixture on your desktop, let the Elite SoundBook remodel your mind. And if you're *really* buried under your work, the Elite SoundBook Plus is available with a 75 MHz or 90 MHz Intel Pentium Processor! Calling MidWest Micro may have been the smartest decision Eugene ever made. Who knows, he might even have time to clean the attic before his wife comes home...

"The Elite SoundBook DX4-100 is the fastest notebook we have ever tested."

— *Mobile Office*, November 1994

"A 100 MHz DX4 CPU coupled with a speedy hard drive give this portable more muscle than any we've tested."

— *PC Computing*, January 1995

MIDWEST MICRO

IT'S IN OUR NATURE

Systems
1-800-682-7248

Peripherals
1-800-445-2035

Minutes ago, Eugene had no idea that his dining room ceiling couldn't support a 50 pound chandelier. He also had no idea how filthy his attic really was. Now he is painfully aware of both. He is also painfully aware that his wife is due home in less than one hour. Luckily, his SoundBook survived the mishap...
Home Repair
Home Repair Atlas
intel inside

Elite Home PCs

486DX2-50 $1499
#008701
- Intel486™ DX2-50 Processor
- 4 Mb RAM, 128 Kb Cache
- 428 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft® Family Bundle — Encarta™, Works, Money, Scenes, Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Digital Quality Speakers
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS® 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

486DX2-66 $1599
#008702

486DX4-100 $1999
#008703
- IntelDX4™ 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Local Bus Graphics with 1 Mb
- PCI Fast IDE Interface
- Double Speed CD-ROM Drive
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- EPA Energy Star Compliant
- The Real 3 Year Warranty

486DX4-75 $1899
#008704

P5-75 $2299
#008705
- Intel® 75 MHz Pentium™ Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- 16-Bit Stereo Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-90 $2199
#008706

P5-90 $2599
#008707
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Double Speed CD-ROM Drive
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-100 $2999
#008708
- With 1 Gb Hard Drive

P5-100 $3499
#008709
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Quad Speed CD-ROM Drive
- Microsoft Family Bundle — Encarta, Works, Money, Scenes, Dangerous Creatures & Golf
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- The Real 3 Year Warranty

P5-90 $3199
#008710

PC MAGAZINE EDITORS' CHOICE
Dec 13, 1994
ATI Graphics XPression

ATI Technologies Inc.
Perfecting the PC

Elite Office PCs

DX2-50 PCI $1199
#008711
- Intel486 DX2-50 Processor
- 4 Mb RAM, 128 Kb Cache
- 428 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- 3.5" Disk Drive
- 14" SVGA .28 N/I Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS® Works for Windows™ 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1299
#008712

DX2-50 PCI $1499
#008713
- IntelDX2 50 Processor
- 4 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 9624 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- 101-Key Enhanced Keyboard
- High-Resolution Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf® '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1599
#008714

DX4-75 PCI $1799
#008715
- IntelDX4 75 Processor
- 8 Mb RAM, 128 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

DX2-66 PCI $1749
#008716

DX4-100 PCI $1899
#008717

TestDrive SUPERSTORE

All Systems with a CD-ROM include TestDrive CD Software and Microsoft Home CD Sampler

Elite Office PCs (Continued)

DX4-100 PCI $1999
#008718
- IntelDX4 100 Processor
- 8 Mb RAM, 128 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 3 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- EPA Energy Star Compliant
- The Real 3 Year Warranty

P5-75 $1999
#008719
- Intel 75 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- PCI Local Bus Graphics with 1 Mb
- Double Speed CD-ROM Drive
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA; 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-75 $2299
#008721
- Intel 75 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Word 6.0, Bookshelf '94, Encarta, Works Multimedia Edition 3.0 & Money 3.0
- The Real 3 Year Warranty

P5-90 $2499
#008722
- Intel 90 MHz Pentium Processor
- 8 Mb RAM, 256 Kb Cache
- 545 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Double Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-60 $1899
#008720

P5-90 $2999
#008723
- Intel 90 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 850 Mb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb
- Double Speed CD-ROM Drive
- 28.8 S/R Fax Modem
- 3.5" Disk Drive
- 15" SVGA .28 Digital Color Monitor with Hitachi CRT
- 8-Bay Mini-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Signature 101-Key Enhanced Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-75 $2799
#008724

P5-90 $3499
#008725
- Intel 90 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb VRAM
- Quad Speed CD-ROM Drive
- 14.4 Fax Modem with Voicemail
- 3.5" Disk Drive
- 17" .28 Digital Color Monitor
- 10-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 $3999
#008726
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb VRAM
- Quad Speed CD-ROM Drive
- 28.8 S/R Fax Modem
- 3.5" Disk Drive
- 17" .26 1600 x 1200 ExactMatch Color Monitor
- 10-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

P5-100 $4199
#008727
- Intel 100 MHz Pentium Processor
- 16 Mb RAM, 256 Kb Cache
- 1 Gb IDE Hard Drive
- PCI Fast IDE Interface
- ATI MACH 64 PCI Accelerator with 2 Mb VRAM
- Quad Speed CD-ROM Drive
- 16-Bit Wavetable Sound Card
- Altec Lansing Stereo Speakers with Subwoofer
- 28.8 S/R Fax Modem
- 3.5" Disk Drive
- 17" .26 1600 x 1200 ExactMatch Color Monitor
- 10-Bay Full-Tower Case
- 4 ISA, 2 PCI & 1 PCI/ISA Slots
- Super I/O using 16550 UART & ECP/EPP
- Microsoft Natural Keyboard
- Microsoft Mouse
- MS-DOS 6.22 and WFW 3.11
- MS Office Professional, Bookshelf '94 & Encarta
- The Real 3 Year Warranty

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17" to 21" ExactMatch	$769
Microsoft Natural Keyboard	$59

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- 64-Bit, 256K Synchronous Burst External Cache
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- External Jacks for Line In & Line Out
- 3.5" Built-in Disk Drive
- User Replaceable Hard Drive
- Two Type II/One Type III PCMCIA Slot
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- Advanced Power Management
- Bi-directional EPP/ECP Parallel Port
- High Speed 16550 UART Serial Port
- Infra Red Wireless "IR" Interface
- External VGA & Keyboard/Mouse Port
- MS-DOS® 6.22 & WFW 3.11
- Microsoft® Works for Windows 3.0 & Golf
- Lotus® Organizer
- Weight: 6.8 lbs.
- Carrying Case
- One Year Manufacturer's Warranty

Dual-Scan Color SoundBook Plus

P5-75 with 340 Mb HDD
#008090 **$2999**

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P5-90 with 720 Mb HDD
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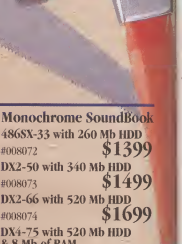
#008091 **$4499**

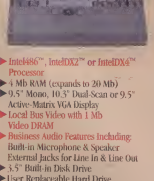
P5-90 with 520 Mb HDD & 16 Mb of RAM
#008027 **$5499**

P5-90 with 720 Mb HDD & 24 Mb of RAM
#008028 **$5999**



intel inside pentium

Elite SoundBook



- Intel486™, IntelDX2™ or IntelDX4™ Processor
- 4 MB RAM (expands to 20 Mb)
- 9.5" Mono, 10.3" Dual-Scan or 9.5" Active-Matrix VGA Display
- Local Bus Video with 1 Mb Video DRAM
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- 3.5" Built-in Disk Drive
- User Replaceable Hard Drive
- Two Type II/One Type III PCMCIA Slot
- Built-in Trackball
- NiMH Battery & AC Adapter
- Advanced Power Management
- One Parallel & One Serial Port
- External VGA & Keyboard Port
- MS-DOS 6.22 & WFW 3.11
- Microsoft Works for Windows 3.0 & Golf
- Lotus Organizer
- Weight: Mono–6.2 lbs. Color–6.7 lbs.
- Carrying Case
- One Year Manufacturer's Warranty

Dual-Scan Color SoundBook

486SX-33 with 260 Mb HDD
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DX2-50 with 340 Mb HDD
#008066 **$2099**

DX2-66 with 520 Mb HDD & 8 Mb of RAM
#008067 **$2499**

DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008068 **$2699**

DX4-100 with 520 Mb HDD & 12 Mb of RAM
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DX4-100 with 700 Mb HDD, 12 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008069 **$3199**

DX4-100 with 700 Mb HDD, 20 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
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Active-Matrix Color SoundBook

DX2-66 with 340 Mb HDD
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DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008078 **$3499**

DX4-100 with 520 Mb HDD & 12 Mb of RAM
#008079 **$3799**

DX4-100 with 700 Mb HDD, 12 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008080 **$3999**

DX4-100 with 700 Mb HDD, 20 Mb of RAM & PCMCIA 14.4 S/R Fax Modem
#008081 **$4499**

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486SX-33 with 260 Mb HDD
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DX2-50 with 340 Mb HDD
#008073 **$1499**

DX2-66 with 520 Mb HDD
#008074 **$1699**

DX4-75 with 520 Mb HDD & 8 Mb of RAM
#008075 **$1999**

DX4-100 with 700 Mb HDD & 8 Mb of RAM
#008076 **$2199**

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Options

4 Mb RAM Card	#005976	$239
8 Mb RAM Card	#005977	$469
16 Mb RAM Card	#005978	CALL
Car Adapter	#005979	$59
Mobile Max PCMCIA 130 Mb HDD	#004805	$289
Mobile Max PCMCIA 170 Mb HDD	#004806	$345
PCMCIA 9624 Fax Modem	#001722	$135
PCMCIA 14.4 Fax Modem	#001812	$179
PCMCIA Combo Ethernet Adapter	#001954	$139

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* Ask your MidWest Micro sales representative about additional hard drive, screen and processor options.

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AD#M02

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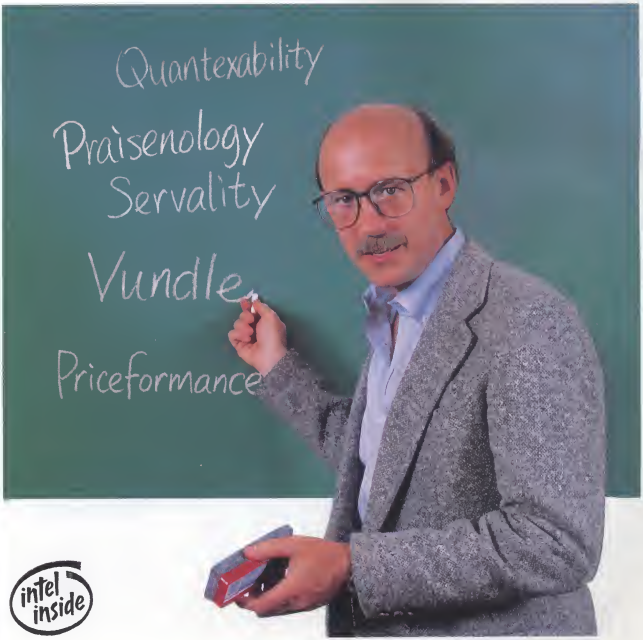

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Quantex has the critics cheering, technology that's topping the charts, plus the best software bundles you'll find, all at a value that won't sink your savings. "Quantexability" means powerful systems that are built strong, built fast, and built to last. Packed with state-of-the-art technology, the finest components, and a valuable bundle of the highest quality software, you'll find that when you compare Quantex feature for feature and dollar for dollar to any other PC, there simply is no comparison. No tricks. No gimmicks. Just great value that lasts. So go ahead and give one of our friendly sales representatives a call today. You'll find that it's easy to see why more and more people are making Quantex their choice.

System pictured with tower case and 17" monitor

"Praisenology"

OCT. 94

NOV. 94

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Quantex is coming on strong with the systems boasting the technology to outperform the competition's best, time and time again. Tried, tested and true, Quantex PC's keep rising to the challenge to take home the trophy. In October, our power-packed QP5/90PM-1 multimedia machine plucked the coveted PC World "Best Buy Award" for Power Desktops. And Computer Shopper (8/94) was right on the Benchmark when they said our QP5-90 powerhouse is "unquestionably a front-runner" after it blew away the top competition's Winstone test scores. Furthermore, PC Computing asserts that we're an "Excellent bet for high-end systems," topping off their fine review with a ★★★★ ranking in their Top 60 Direct Vendors review (7/94.) And Computer Shopper says it all—when you buy Quantex, "you get a lot for your money..." (6/94).

COMPUTER SHOPPER

"The Quantex QP5/90PM-2 is as close to a turnkey multi-media PC as any machine we've seen." (11/94)
Feature Story (8/94)

PCComputing

"★★★★" (7/94)

PC WORLD

Best Buy Top 20 Power Desktops
(10/94, 11/94)

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Quantex builds systems right. With the fastest processors, biggest hard drives, and premier software. And we seal the deal with a service package that's sure to inspire confidence. Not only do you get One-Year Free Parts and Labor, One-Year Free On-Site Service, our 30-day money-back guarantee, plus a lifetime of toll-free technical support—you can now take advantage of our extended warranty option, the GE Service Protection Plus plan. With your Quantex system covered for up to four years, you get nothing but peace of mind. Call one of our friendly sales professionals today to get the details on our new way of keeping your system protected for years to come.

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Looking for peak performance at a price that won't break the bank? You've come to the right place. Whether it's a feature-packed multimedia machine or a peak-performance workstation, you'll get systems chock-full of the most advanced stuff on the market. With Pentium processors running at up to an aggressive 90 MHz, you're gonna get plenty of power for today and tomorrow. Our hard drives have been beefed-up, and with colossal 730MB and 1Gig of storage you get practically unlimited room to roam. Dual PCI and the awesome performance of a 64-bit Graphics Engine give you faster, more colorful display—you'll see the depth of the difference on our extra-large 17" monitors. So why break the bank? Quantex works hard to make your choice easy.

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Q486DX2/66PM $1699

- IntelDX2™ 66 Processor
- 8MB RAM, 128KB Fast Cache
- 540MB 12ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics Engine w/ 1MB
- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin Multisession CD-ROM Drive
- 16-Bit Stereo Sound Card w/Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken® Special Edition financial manager
- CD Discs: Compton's Interactive Encyclopedia, AAA Trip Planner, The Family Doctor, Megarace, and WordPerfect MainStreet Select

Q486DX4/100 PM.....$1799
QP5/60 PM.....$1899

Multimedia Systems

QP5/60 PM-2 $1949

BEST BUY

- Intel Pentium™ Processor
- 8MB RAM, 256KB* Fast Cache
- 540MB 12ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics Engine w/ 2MB
- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin Multisession CD-ROM Drive
- 16-Bit Stereo Sound Card w/Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken Special Edition financial manager
- CD Discs: Compton's Interactive Encyclopedia, Megarace, and WordPerfect PerfectOffice™ suite

Q486DX2/66 PM-2.....$1749
Q486DX4/100 PM-2.....$1849

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- 8MB RAM, 256KB* Fast Cache
- 540MB 12ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics Engine w/ 1MB
- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- MS-DOS & Windows for Workgroups 3.11

Q486DX2/66 W-1.....$1449
Q486DX4/100 W-1.....$1549

QP5/90 W-2 $2499

- Intel Pentium™ Processor
- 850MB 10ms IDE Hard Drive
- 16MB RAM, 256KB* Fast Cache
- 3.5" 1.44MB Floppy Drive
- Double-spin Multisession CD-ROM Drive
- 64-Bit PCI Bus Graphics Engine w/ 2MB
- PCI Local Bus IDE Controller
- 14,400 Baud Fax/Modem w/software
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- MS-DOS & Windows for Workgroups 3.11

QP5/75 W-2.....$2249
QP5/100 W-2.....$2699

QP5/75 PM-1 $1999

BEST BUY

- Intel Pentium™ Processor
- 8MB RAM, 256KB* Fast Cache
- 850MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics Engine w/ 1MB
- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin Multisession CD-ROM Drive
- 16-Bit Stereo Sound Card w/Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken Special Edition financial manager
- CD Discs: Compton's Interactive Encyclopedia, AAA Trip Planner, The Family Doctor, Megarace, and WordPerfect MainStreet Select

QP5/90 PM-1.....$2249
QP5/100 PM-1.....$2449

QP5/90 PM-3 $2599

BEST BUY

- Intel Pentium™ Processor
- 16MB RAM, 256KB* Fast Cache
- 850MB 10ms IDE Hard Drive
- 3.5" 1.44MB Floppy Drive
- 64-Bit PCI Bus Graphics Engine w/ 2MB
- PCI Local Bus IDE Controller
- 15" Digital .28mm Flat Color Monitor
- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin Multisession CD-ROM Drive
- 16-Bit Stereo Sound Card w/Speakers
- MS-DOS & Windows for Workgroups 3.11
- Quicken Special Edition financial manager
- CD Discs: Compton's Interactive Encyclopedia, Megarace, and WordPerfect PerfectOffice suite

Q486DX4/100 PM-3.....$2899
QP5/75 PM-3.....$2349
QP5/100 PM-3.....$2799

QP5/100 W-3 $2999

Same as QP5/100 W-2 but with following upgrades

- 1080MB 10ms IDE Hard Drive
- 17" Digital Color Monitor
- Super Fast Double-spin Enhanced IDE CD-ROM w/ 250ms Access & 256KB Buffer

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*All Pentium systems come with 256KB cache, 486DX2/66 and 486DX4/100 systems come with 128KB cache standard. WordPerfect MainStreet select includes WordPerfect Works, InfoCentral, ClipArt, Grammatik, Random House Webster's School & Office Dictionary, and WellBeer deck. The Lost Leonardo. PerfectOffice software includes WordPerfect 6.1, Quattro Pro, Presentations, InfoCentral, Envoy, and Groupwise. Some software packaging may be cosmetically different than pictures shown. Quantex accepts prepaid checks, Visa, MasterCard, Discover, and American Express. Purchase orders from government agencies, universities, and Fortune 1000 companies also accepted. Call for details regarding Quantex's money-back guarantee, warranty, and 4-year on-site service option. On-Site Service may not be available in certain remote areas. All returned items must have a Return Merchandise Authorization (RMA) number and must be in original packaging. The cost for returned freight is not included with any Money-Back Guarantees; shipping charges are non-refundable. Prices and product descriptions subject to change without notice. Quantex Microsystems cannot be responsible for errors in typography or photography. Due to volatility of prices, Quantex does not offer a price protection policy. The Intel inside Logo, Intel486, IntelDX2, OverDrive, and Pentium are trademarks of Intel Corporation. Some of the names or trademarks shown herein may be the property of other companies. Screen images simulated.

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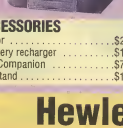
Z-NOTEFLEX Multimedia Notebook

Modular architecture for a multitude of user-upgradable features.

- ▲ User upgradable processor, memory, hard drive, display and more
- ▲ 4MB/8MB RAM exp. to 24MB
- ▲ 32-bit VESA local bus video
- ▲ Detachable video display
- ▲ Built-in 16-bit stereo sound with speaker and microphone
- ▲ Integrated trackball
- ▲ Two Type II or one Type III PCMCIA slots
- ▲ MS-DOS, Windows for Workgroups, Indeo Video
- ▲ 3-Year Warranty

Processor	RAM	Screen	Hard Drive	Price
486SX/33	4MB	10.4" Mono	200MB	$2289
486DX2/50	4MB	10.3" Dual Scan	200MB	$2759
486DX2/50	4MB	10.3" Dual Scan	340MB	$2969
486DX2/50	4MB	9.5" Active	340MB	$4099
486DX2/50	8MB	9.5" Active	450MB	$4419
486DX4/75	8MB	9.5" Active	520MB	$4989

as low as **$2289**



ZENITH DATA SYSTEMS

Z-NOTEFLEX ACCESSORIES

FLEXDOCK port replicator	$219.99
FLEXBAY floppy bay/battery recharger	$159.99
FLEXSHOW Multimedia Companion	$799.99
FLEXSITE LCD Display Stand	$199.99

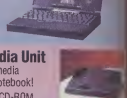
Z-STAR EX

High-end features at a low-end price!

- ▲ 486DX2/50 processor
- ▲ 4MB/8MB RAM expandable to 20MB
- ▲ Modular design with removable hard drive & floppy drive
- ▲ 32-bit VESA local bus graphics, 1MB video RAM
- ▲ Two Type II or one Type III PCMCIA slot
- ▲ Audio module slot
- ▲ Enhanced J-Mouse pointing device
- ▲ Built-in AC adapter
- ▲ MS DOS, Windows 3.1 and CoSession Host software
- ▲ 1-Year Z-CARE on-site service

Processor	RAM	Screen	Hard Drive	Price
486DX2/50	4MB	9.5" Mono	200MB	$1199
486DX2/50	4MB	9.5" Dual Scan	200MB	$2199
486DX2/50	8MB	9.5" Dual Scan	340MB	$2599
486DX2/50	4MB	9.5" Active	340MB	$3099

as low as **$1699**



Z-PLAYER Multimedia Unit

A complete portable multimedia solution for any PCMCIA notebook!

- ▲ Integrated double-speed CD-ROM drive, 16-bit stereo sound, speakers & audio in/out ports
- ▲ PCMCIA Type II interface included
- ▲ Upgrade any notebook with PCMCIA to a full multimedia machine in one easy step

$499.99

Hewlett Packard

The Perfect Notebook Companion

DeskJet/DeskWriter 320

- ▲ 600 x 300dpi with REt (black)
- ▲ High quality 3PPM printing
- ▲ 1-Year Warranty
- ▲ Optional sheet feeder and color kit

NEW!

DeskJet 320 $299.99
DeskWriter 320 $299.99

DeskJet 320 Shown with optional sheet feeder and color kit

DeskJet/DeskWriter 540

- ▲ Sharp, 600x300 dpi "laser-like" print quality with REt (black)
- ▲ 15% faster with 512KB RAM
- ▲ 3-Year Warranty

DeskJet 540 $289.99
DeskWriter 540 $289.99

DeskJet/DeskWriter 560C

- ▲ 600x300 dpi "laser-like" print quality (300dpi color)
- ▲ Resolution Enhancement Technology for smooth, crisp text and graphics
- ▲ 3-Year Warranty

DeskJet 560C $479.99
DeskWriter 560C $479.99

DeskJet 1200C

- ▲ Sharp 600x300 "laser-like" print-quality with ColorSmart
- ▲ 2MB memory expandable to 26MB
- ▲ 180 sheet paper tray
- ▲ 1-Year Warranty

DeskJet 1200C $999.99
DeskJet 1200C/PS $1589.99

LaserJet 4P

- ▲ Sharp, 600dpi print-quality
- ▲ 2MB RAM w/Memory Enhancement Technology
- ▲ 1-Year Warranty

LaserJet 4P $959.99

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- ▲ Resolution Enhancement Technology
- ▲ 1-Year Warranty

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- ▲ 10.4" active matrix color display
- ▲ 1 Type II and 1 Type III PCMCIA slots
- ▲ Accupoint integrated pointing device
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ MS-DOS 6.21, Windows for Workgroups 3.11, Windows Sound System 2.0, Indeo Video, and Runtime Video for Windows

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10.4" Active Matrix Color Display

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- ▲ 82-key keyboard
- ▲ MS-DOS, Windows 3.1
- ▲ Ballpoint mouse with Quickport (T1900)
- ▲ Accupoint pointing device (T2400)
- ▲ Enhanced power management

Model	Processor	Screen	Hard Drive	Price
T1910	486SX/33	9.5" Mono	200MB	$1319
T1910	486SX/33	9.5" Dual scan	200MB	$1779
T1960	486DX2/50	9.5" Dual scan	200MB	$2159
T1960	486DX2/50	9.5" Dual scan	320MB	$2329
T1960	486DX2/50	8.4" Active	200MB	$2749
T1960	486DX2/50	8.4" Active	320MB	$2919
T2400	486DX2/50	9.5" Dual Scan	250MB	$2749
T2400	486DX2/50	9.5" Dual Scan	320MB	$2879
T2400	486DX2/50	8.4" Active	250MB	$3299
T2400	486DX2/50	8.4" Active	320MB	$3419

Business Lease: $50/mo.

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- ▲ Ultra-portability at only 4.4 lbs.
- ▲ 486SX/33 or 486DX2/50 processor
- ▲ 4MB RAM expandable to 20MB
- ▲ PCMCIA Type II slot
- ▲ External 3.5" disk drive
- ▲ Integrated AccuPoint pointing device

Processor	Screen	Hard Drive	Price
486SX/33	7.8" Active	250MB	$2219
486DX2/50	8.4" Active	250MB	$3469

Business Lease: $81/mo.

T3400

T4700, T4800 and T4850

as low as **$3429**

- ▲ Brilliant color display with local bus video
- ▲ 1 Type II and 1 Type III PCMCIA slot
- ▲ Microsoft Sound System, built-in microphone, audio out port
- ▲ MS-DOS, UltraFont, Indeo video compression software, Windows for Workgroups 3.11

Model	Processor	Screen	Hard Drive	Price
T4700	486DX2/50	9.5" Active	200MB	$3429
T4700	486DX2/50	9.5" Active	320MB	$3629
T4800	486DX4/75	9.5" Active	500MB	$4799
T4850	486DX4/75	10.4" Active	500MB	$5199
T4850	486DX4/75	10.4" Active	772MB	$5569

Business Lease: $129/mo.

T4700

Texas Instruments

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TravelMate 4000M Full Multimedia Mobile Computing

TravelMate 4000M

as low as **$1879**

- ▲ Brilliant color display
- ▲ 16-bit sound card
- ▲ Integrated Pointing device
- ▲ 2 Type II or 1 Type III PCMCIA slot

Processor	Screen	Hard Drive	Price
486SX/25	8.2" Enhanced Color	120MB	$1879
486SX/50	9.5" Dual Scan	200MB	$2759
486SX2/50	8.4" Active	340MB	$3099
486DX2/50	9.5" Dual Scan	340MB	$3049
486DX2/50	8.4" Active	455MB	$3649
486DX4/75	9.5" Dual Scan	455MB	$3999
486DX4/75	8.4" Active	340MB	$4889
486DX4/75	8.4" Active	455MB	$5249
486DX4/100	9.5" Active	525MB	$5549

Business Lease: $69/mo.

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TM 4000M

CD-ROM Docking System

Transform your TravelMate 4000M into the Ultimate Mobile Multimedia System with the Portable CD-ROM docking system.

- ▲ Double-speed CD-ROM drive
- ▲ 250ms access time
- ▲ Built-in speakers
- ▲ SCSI II connector

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TM 4000M
Shown with optional docking system

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Ascentia 800N

- ▲ 486 DX2/50 processor
- ▲ 4MB RAM expandable to 20MB
- ▲ Removable hard drive and floppy drive
- ▲ 2 Type II or 1 Type III PCMCIA slot

Model	Hard Drive	Price
4/50d Model 253W	250MB	$2349
4/50d Model 343W	340MB	$2499

Business Lease: $86/mo.

Bravo MS Desktops

NEW!

Extra Performance

- ▲ 8/16MB RAM expandable to 128MB
- ▲ 64-Bit PCI local bus graphics
- ▲ Enhanced IDE controller supports 4 devices
- ▲ Advanced security features
- ▲ Energy Star compliant

Model	RAM	Hard Drive	Price
486DX2/66	8MB	270MB	$1579
Pentium 60Mhz	8MB	420MB	$1999
Pentium 90Mhz	8MB	420MB	$2369

Monitors sold separately.

Business Lease: $50/mo.

AST Advantage!

Adventure Multimedia

- ▲ Available in All-N-One, Desktop, or Minitower models
- ▲ Double speed IDE CD-ROM drive
- ▲ 16-Bit Creative Labs Soundblaster
- ▲ 14.4 Send/Receive Fax modem w/telephone answering
- ▲ Over 17 software titles
- ▲ 3-Year Warranty

Processor	Hard Drive	Price*
486DX2/66 All-In-One	420MB	$1499†
486DX2/66 Desktop	420MB	$1589
Pentium 60MHz Desktop	540MB	$1999

Business Lease: $55/mo.

**AST Color Monitors start at $369.99*
+ Includes monitor

NEW!

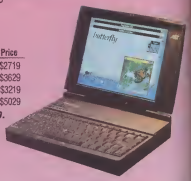
Adventure Multimedia

Ascentia 900N

- ▲ 4MB/8MB RAM exp. to 32MB
- ▲ Removable hard drive
- ▲ 2 Type II or 1 Type III PCMCIA slot

Model	Screen	Hard Drive	Price
4/50 Model 343W	10.3" Dual Scan	340MB	$2719
4/50 Model 343W	9.5" Active	340MB	$3629
4/75 Model 343W	10.3" Dual Scan	340MB	$3219
4/75 Model 513W	10.4" Active	510MB	$5029

Business Lease: $100/mo.



Ascentia 900N

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ProLinea Desktops

- ▲ 4MB RAM expandable to 100MB
- ▲ 3.5" floppy drive
- ▲ Local bus graphics
- ▲ Pentium upgradable
- ▲ Energy Star compliant
- ▲ MS DOS 6.0, Windows 3.1

Processor	RAM	Hard Drive	Price
486SX/33	4MB	270MB	$1059
486SX2/50	4MB	270MB	$1169
486DX2/50	4MB	420MB	$1379
486DX2/66	4MB	420MB	$1499
486DX2/66	4MB	525MB	$1639
486DX4/100	8MB	420MB	$1999

*COMPAQ color monitors start at $239.99
Monitors sold separately.

LTE Elite

as low as $2739

- ▲ 4/8MB RAM exp. to 20/24MB
- ▲ Built-in AC adapter
- ▲ Removable hard drive
- ▲ 2 Type II or 1 Type III PCMCIA slots
- ▲ Integrated trackball
- ▲ MS-DOS 6.2, Windows 3.1, MS Video for Windows Runtime

Processor	Display	Hard Drive	Price
486DX2/40	9.5" Dual Scan	170MB	$2739
486DX2/40	8.4" Active	170MB	$3219
486DX2/40	8.4" Active	340MB	$3689
486DX2/50	9.5" Active	340MB	$4539
486DX4/75	9.5" Active	340MB	$5099
486DX4/75	9.5" Active	510MB	$5479

Business Lease: $101/mo.

LTE Elite

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as low as $2459

- ▲ 486DX2/40 processor
- ▲ 4MB RAM expandable to 20MB
- ▲ 2 Type II or 1 Type III PCMCIA slots
- ▲ Large built-in trackball
- ▲ MS-DOS, Windows 3.1, Tabworks, Lotus Organizer

Display	Hard Drive	Price
9.5" Dual Scan	250MB	$2459
8.4" Active	250MB	$3119

Business Lease: $90/mo.

Contura 400

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- 486DX4/100 processor w/16KB cache
- 8MB RAM expandable to 40MB
- 340MB, 540MB or 810MB hard drive
- **Huge 10.4" brilliant screen (active or dual scan)**
- Built-in sound, speaker, microphone
- Built-in 14.4 data/fax modem
- Infrared ports for wireless data transfer
- **Built in telephone answering machine & speaker phone**
- 2 PCMCIA Type II slots
- Over 15 popular software titles included!

The Multimedia ThinkPad 755CD also includes:
Removable full-size CD-ROM drive
Enhanced video, stereo speakers, MIDI/joystick port and lots more multimedia software!

ThinkPad 755CD

ThinkPad® 360 and 360E

- 4MB RAM exp. to 20MB
- Modular design, removable hard drive & floppy drive
- Local Bus Graphics with 1MB video RAM
- 2 Type II or 1 Type III PCMCIA slot
- TrackPoint II integrated pointing device
- IBM DOS 6.3, Windows 3.1, Lotus cc:Mail, Organizer, ScreenCam, Official Airline Guide FlightDisk, CoSessions Host, Prodigy, America Online, and FaxWorks 3.0
- Port Replicator and Docking Station available

Processor	Screen	Hard Drive
486SL/33	9.5" Mono	170MB
486SL/33	9.5" Mono	340MB
486SL/33	9.5" Dual Scan	170MB
486SL/33	9.5" Dual Scan	340MB
486SL/33	8.4" Active	170MB
486SL/33	8.4" Active	340MB
486DX2/50	9.5" Dual Scan	340MB
486DX2/50	9.5" Dual Scan	540MB
486DX2/50	8.4" Active	340MB
486DX2/50	8.4" Active	540MB

ThinkPad® 510 Subnotebook

- IBM 486BL2/50 processor
- 4MB RAM exp. to 20MB
- 200MB hard drive
- 7.7" color display
- Type II PCMCIA slot
- TrackPoint II integrated pointing device
- 3.5" external floppy drive
- Weighs only 4.0 lbs.
- IBM DOS 6.3, Windows 3.1, Lotus cc:Mail, Organizer, ScreenCam, Official Airline Guide FlightDisk, CoSessions Host, Prodigy, America Online, and FaxWorks 3.0

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Pentium Power and Unparalleled Displays

Versa M and Versa P

NEW!

- 2 Type II or 1 Type III PCMCIA slots
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- Removable screen
- Integrated speaker, microphone
- MS-DOS, Windows 3.1, Windows Sound System, Video for Windows Run Time

as low as $3589

Processor	Hard Drive	Screen	Price
486DX4/75	340MB	Dual Scan	$3589
486DX4/75	540MB	Active	$4729
486DX4/75	540MB	High Res.	$5099
486DX4/100	810MB	Active	$5569
Pentium 75	540MB	Active	$5389
Pentium 75	810MB	Active	$5899

Business Lease: $118/mo.

Versa M

Ready Multimedia Desktops

- VESA local bus graphics
- NEC CD-ROM drive
- SoundBlaster 16 sound card
- Speakers, microphone
- Fax modem
- MS-DOS, Windows, Quicken and more
- CD titles: Compton's Encyclopedia, PFS Window Works

MULTI MEDIA READY

Processor	Hard Drive	Price
486SX/33 Desktop	270MB	$1299
486DX2/66 Desktop	340MB	$1479
486DX2/66 Minitower	420MB	$1539
P60 Minitower	420MB	$1899

Business Lease: $50/mo. Monitors sold separately

Ask about the new series of XE and XP monitors!

Versa V

as low as $2499

- 4MB expandable to 20MB
- 2 Type II PCMCIA slots or 1 Type III
- Removable hard drive
- Removable floppy – add second battery
- MS-DOS 6.21, Windows 3.1, built-in trackball

Processor	Screen	Hard Drive	Price
486DX2/50	9.5" Dual Scan	250MB	$2499
486DX2/50	9.5" Dual Scan	340MB	$2669
486DX2/50	9.5" Active	250MB	$3249
486DX2/50	9.5" Active	340MB	$3399
486DX2/50	9.5" Active	540MB	$3779
486DX4/75	9.5" Active	340MB	$3879
486DX4/75	9.5" Active	540MB	$4249

Business Lease: $92/mo.

Versa S

as low as $1229

- Large 9.5" screen
- SurePoint integrated pointing device
- 2 Type II PCMCIA slots or 1 Type III
- Only 4 lbs.

Processor	Screen	Hard Drive	Price
486SX/33	9.5" Mono	210MB	$1229
486SX/33	9.5" Dual Scan	210MB	$1429
486SX/33	9.5" Active	210MB	$2179
486DX2/50	9.5" Active	260MB	$2369
486DX2/50	9.5" Active	350MB	$2549

Business Lease: $50/mo.

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256K CACHE

Upgradable to 512KB or 1MB memory. Standard in a notebook is unrivaled performance up to 40%.

INTERNAL CD-ROM (optional)

5 1/4 2X CD-ROM – access CD-libraries & applications, watch movies, or play stereo CDs.

TV-TUNER MODULE (optional)

Now you can watch TV or VCR video on your notebook with the TV Module – with NTSC/PAL input or composite video input.

Thanks to Sager's new CD-ROM & Local-Bus notebooks, the days of the desktop are definitely numbered.

Sager's NP9500 features an internal 5 1/4" double-speed CD-ROM (optional), 256KB Secondary Cache & 4 PCMCIA Type II slots for workstation power.

And Sager's NP7500 Local Bus notebook is 45% faster than other notebooks.

When you can have the same power in a portable as you can in a desktop, why go anywhere else? This time make it a notebook from Sager.

GOVERNMENT SPECIAL PRICING AVAILABLE

NP7500

- Intel Pentium or 486 CPU

Pentium:
- 256KB Secondary Cache Memory
- 8MB RAM Expandable to 40MB
- 16-bit Stereo Audio with Speaker & Microphone
- 1 16550 Compatible Serial Port
- 1 Parallel Port with ECP/EPP Support

486:
- 4MB RAM Expandable to 36MB
- Built-in Audio Chip with Speaker & Microphone
- 1 Serial & 1 Parallel Port

- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- Removeable 340MB Hard Drive (250, 520, 810MB Optional)
- 3.5" 1.44MB Floppy Drive
- 9.5" Mono, 10.3" Dual Scan, 9.5" Or 10.4" Active Matrix VGA Display CRT: 1024x768, 256 Colors
- Simultaneous CRT & LCD Operation
- Large Built-In 19mm Trackball
- Intelligent Power Management with SMM
- 2 PCMCIA Type I & II or 1 Type III Slot
- Super Long Life NiMH battery
- Other Ports: Ext. keyboard, Ext. VGA monitor, & 200 Pin Connector for docking station
- Jacks - 1 line in & 1 line out
- 86-Key Keyboard
- Microsoft DOS 6.22
- Carrying Bag & AC Adapter
- Weight 6.6lbs. (with Battery)
- 11.14"W x 9.48"D x 1.95"H
- Sager's Umbrella Protection Policy

NP7500 OPTIONS

VL-Bus Docking Station
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Car Adapter
PCMCIA Cards (FAX/Modem, Ethernet, SCSI & More)

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ktop is Over.

NP9500

- Intel Upgradeable 486 CPU
- 1MB Video RAM
- 32-bit VESA Local Bus Video with Windows Accelerator
- 32-bit Local Bus IDE
- 256KB Secondary Cache Memory Expandable to 512KB or 1MB
- 16-Bit Stereo Sound with 2 Stereo Speakers and 1 Microphone
- 4MB RAM, Expandable to 64MB
- Removable 340MB Hard Drive (250, 520, 810MB Optional)
- Removable 3.5" 1.44MB Floppy Drive
- 9.5" Mono, 10.3" Dual Scan, 9.5" or 10.4" Active Matrix VGA Display CRT: 1024x768, 256 Colors
- Simultaneous CRT & LCD Operation
- Integrated Pointing Device
- Advanced Power Management with SMM
- 4 PCMCIA Type I & II or 2 Type III Slots
- Super Long Life NiMH Battery
- 2 16C550 Compatible Serial Ports
- 1 Parallel Port with ECP/EPP Support
- Other Ports: Game, Ext. Keyboard, Ext. VGA Monitor, Ext. FDD & 200 Pin Connector for Docking Station
- Jacks - 1 line in, 1 line out & 1 Microphone
- 85-Key Keyboard
- Microsoft DOS 6.22
- Carrying Bag & AC/Adapter
- Weight 7 lbs. with Battery
- 11.6"W x 9.06"D x 2.44"H
- Sager's Umbrella Protection Policy

NP9500 OPTIONS

5.25" Double Speed CD-ROM Module
3.5" HDD Module
TV Tuner Module
2nd & 3rd Battery Module
Docking Station
Car Adapter
Numeric Keypad
PCMCIA Cards (FAX/Modem, Ethernet, SCSI & More)

OTHER NP9500 HIGHLIGHTS

- **Advanced Local Bus Video System**
  1MB Video RAM, 32-Bit VESA Local Bus Video w/Windows Accelerator, & Multimedia Interface for Live Video.
- **32-Bit Local Bus IDE**
  Improves Data Transfer Rate Up To 45%.
- **Advanced Audio True-Sound System**
  Built-in 16-Bit Audio, 1 Microphone, 2 Stereo Speakers & Audio Amplifier
- **4 PCMCIA Type II Ports**
  Twice the PCMCIA capability of any other notebook
- **Super-Long Operating Time - Up to 87-Watts of Power**
  Comes standard with one 35 Watt NiMH battery pack, which will give 2.5 hours of operating time; PLUS notebook can handle 2nd & 3rd battery pack modules which will give an additional 35Watts or 17Watts (87Watts total) - which results in up to 6.5+ hours run time
- **Interchangeable Modules**
  Choose from many interchangeable modules that can be used in both the notebook and/or docking station - including 5 1/4" 2x CD-ROM, TV-Tuner, 3 1/2" FDD, 3 1/2" HDD and extra battery modules

S A G E R	S Y S T E M S			
	9.5" MONO	10.3" COLOR DUAL SCAN	9.5" COLOR ACTIVE MATRIX	10.4" COLOR ACTIVE MATRIX
NP7500/486SX-33	$1545	$1995	$2745	
NP7500/486DX-33	$1625	$2075	$2825	
NP7500/486DX2-66	$1695	$2145	$2895	
NP7500/486DX4-100	$1995	$2445	$3195	
NP7500/PENTIUM-90		$2995	$3745	$3945
NP9500/486SX-33	$1675	$2125	$2875	$3075
NP9500/486DX2-66	$1825	$2275	$3025	$3225
NP9500/486DX4-75	$2045	$2495	$3245	$3445
NP9500/486DX4-100	$2125	$2575	$3325	$3525

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Ascentia 900n	4MB	$205
	8MB	$399
Bravo NB 486	8MB	$169
	16MB	$399
PowerExec 4/25SL, Color, Plus	4MB	$185
	16MB	$629

COMPAQ

Contura Aero 4/25c	4MB	$146
	8MB	$299
Contura 5/30, 5/25, 5/25i	4MB	$148
	8MB	$298
Contura 400 (model)	4MB	$185
	8MB	$369
Contura 4/25, 4/25cx, 4/25c	4MB	$169
	8MB	$299
LTE Elite	4MB	$179
	8MB	$359
	16MB	$599
LTE Lite 20, 25, 25c, 25e	4MB	$200
	8MB	$349
	16MB	$739
LTE Lite 4/25c	4MB	$180
	8MB	$339

IBM

ThinkPad 500	8MB	$359
ThinkPad 340, 355, 360, 750	4MB	$149
	8MB	$320
	16MB	$659
ThinkPad 700, 720, 755	4MB	$199
	8MB	$379
	16MB	$649
	32MB	$1399
ThinkPad 701C	4MB	$179
	8MB	$315
L40SX, N33SX, PS/Note 182	4MB	$146
	8MB	$288

NEC

Ultralite Versa (all models)	4MB	$189
	8MB	$349
(Excluding 486 & S8E models)	16MB (5 1/2")	$619

Texas Instruments

TravelMate 4000 (all models)	4MB	$189
	16MB	$1189

Toshiba

T2000, 3000SX, 32e	4MB	$149
T2200SX, T1800 Series	8MB	$329
T3400	4MB	$185
	8MB	$339
T4400, T6400 (all models)	4MB	$179
	8MB	$339
	16MB	$675
T3900, T4900, T4600,	4MB (3 5/8)	$189
T4700, (all models)	8MB (3 5/8)	$349
	16MB (3 5/8)	$779

Zenith

Z-Note 425 Series	4MB (3 5/8)	$155
	8MB (3 5/8)	$369
Z-Star	4MB	$159
	8MB	$369

STANDARD SIMMS

30-PIN		72-PIN	
1 x 3-70ns (5-hip/10Ω)	$6.5	512 x 36-70ns (2MB)	$73
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4 x 9-70ns (4MB)	$128	2 x 36-70ns (8MB)	$285
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8MB	501545-001	$399	16MB 501546-001 $632
32MB	501567-001	$1,007	64MB 501568-001 $1,999
Premmia MTE, SE P/60			
4MB	501159-001	$190	8MB 501159-002 $357
16MB	501159-003	$1,200	32MB 501159-004 $2,200
Bravo 386-SX, WS/286, 386			
2MB	500510-002	$88	4MB 500510-008 $195
Bravo 5/25s			
2MB	500710-004	$89	8MB 500624-002 $304
Advantage! Plus 486DX/25, DX2-50, DX2-66			
4MB	501164-001	$179	8MB 500824-001 $304
Advantage! and Advantage! Pro 386SX/20, 25, Bravo 5/33s			
2MB	500962-001		$180
8MB	500962-002		$272
Advantage! Pro 486DX/33, SX/25			
Bravo LC, LC 3L, LP, and MT			
2MB	500967-001		$96
4MB	500967-003		$159
16MB	500967-005		$549
32MB	500967-005		$1089

COMPAQ

Presario 500, 700 and 900 series			
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16MB	147524-001	$949	32MB 147525-001 $1019
ProLinea 5/25s, 5/25sb			
2MB	141738-001		$69
8MB	141742-001		$249
Presario 600 and 800 series, ProLinea 4/25, 4/33, 4/50, 4/66			
ProLinea MT and ProLinea Enhanced series, ProSignia 2/66			
2MB	141684-001		$95
4MB	141684-001		$179
8MB	141685-001		$369
DeskPro 386-20, 25, 385-20s, 25s			
1MB Module	131151-001		$62
4MB Module	131152-001		$249
DeskPro 386s/16			
1MB Module	113646-001		$62
4MB Module	112534-001		$194
4MB Board	113634-001		$259
DeskPro 5/25s, 5/33, 4/25SL, 33L 66s, 28MS, 386/s, 5/50/20, 20N, SystemPro 12 and M Series			
1MB	118688-001	$49	2MB 118689-001 $95
4MB	118690-001	$170	8MB 118877-001 $356
DeskPro 386-33, 486-33, SystemPro and SystemPro R series			
2MB	115144-001	$169	8MB 116561-001 $376

DELL

Optiplex, ME and 9 models, PowerEdge XE models			
Performance 1, M and T models			
4MB	310-3835	$189	16MB 310-3337 $549
Power Desktop and Low Profile Power Desktop models			
4MB	310-2507		$169
16MB	310-2625		$669

IBM, continued

PS/2 80-A21, A31, A16		
4MB	6451060	$195
Expansion boards for PS/2 80286 based models		
4-16MB w/2MB	64F6609 (use 72-pin)	$299
Expansion boards for PS/2 80386 based models		
2-16MB w/2MB	34F9777 (use 72-pin)	$305
4-16MB w/4MB	34F9011 (use 72-pin)	$299

NEC

Image 425, 433, 466		
4MB	410-12802	$168 16MB 410-12805 $559
Ready 425, 433		
4MB	n/a	$148 16MB n/a $559
PowerMate 386SX/20c, ec, 16c, 25, 486/50i, 33i		
8MB	OP-410-2101	$304
PowerMate SX Plus		
2MB Board	n/a	$215
4MB Board	n/a	$299

ZENITH

Z-400-n, Z-Station 50h, 50n, 50, 3n, 16h, 16n and Xen Z-300/400 Series, Z-430/SX, Z-425/SX, Z-455/DX, SX		
4MB	ME-100	$179
16MB	ME-90	$610
Z-Select 100 models		
4MB	AME-0073	$179 8MB AME-0073 $354
Zenith Z-386/20, 25, 33, 33F		
1MB	ZA386MEK	$49
4MB	ZA386MEM	$179

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Vectra 486 M, M, N, NI and XM models			
2MB	D2381A	$95	8MB D2152A $354
4MB	D2156A	$179	16MB D2670A $641
Vectra VL2, XP, XU1, M2, N2 and XM2 models			
Netserver LM, LC and LF models			
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16MB	D2297A	$669	32MB D2298A $1182

IBM

Aptiva 300, 500 and 700 series		
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Valuepoint Performance models		
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8MB	92G7520 or 73G3152	$356
PS/2 55SX, 33, 465X, 95, 95SX, L8, 65SX L8, 70, 85mmx		
2MB	6459604	$87
PS/Valuepoint Cox models		
4MB	34F2935 or 83F9977	$179
PS/2 90 XP, 95 XP, P75 (parts) 56, 57 (all models)		
PS/1 Consultant, Essential, Expert models, PS/1 Pro M2123		
4MB	6450128	$149 8MB 6450150 $356
PS/2 55SX, 33, 60SX, P5/Valuepoint		
8MB	6450129	$356

LASER PRINTER MEMORY

HP LaserJet 4L		
1MB	C2024A	$48
HP LaserJet IIP, III, IIIP, IIID		
2MB	33477B	$95 4MB 33477B $169
HP LaserJet II, IID		
2MB	33648B	$95 4MB 33648B $169
HP LaserJet IIIsi, 4, 4M, 4Si, 4SiMX, 5L500, Deskjet 1200c		
1MB	C3063A	$48 2MB C2064A $94
4MB	C2063A	$174 8MB C2066A $359
HP LaserJet 4P, 4MP, Color LaserJet		
2MB	C3133A	$95 4MB C3132A $179
HP Deskjet 500, 500c, 520, 520C, 550C, 560C		
2MB	22707B	$49

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- PowerExec 4/25SL, Color, Plus — 4MB ..... $185; 16MB $629

COMPAQ

- Contura Aero 4/25, 4/33c — 4MB ..... $179; 8MB $299
- Contura 3/20, 3/25, 3/25c — 4MB ..... $148; 8MB $298
- Contura 400 models — 4MB ..... $185; 8MB $369
- Contura 4/25, 4/25cx, 4/25c — 4MB ..... $169; 8MB $299
- LTE Elite — 4MB ..... $179; 8MB $319
- LTE Lite 20, 25, 25c, 25e — 4MB ..... $599; 8MB $336
- LTE Lite 4/25c — 8MB ..... $549; 16MB ..... $729; 4MB ..... $180; 8MB $339

IBM

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T3400 — 4MB ..... $185; 8MB $359
T4400, T6400 (all models) — 4MB ..... $179; 8MB ..... $339; 16MB $675
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Zenith

Z-Note 425 Series — 4MB (3.5 V) ..... $155; 8MB (3.5 V) $369
Z-Star — 4MB ..... $159; 8MB $369

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- Premmia MTX, SE P/60
  - 4MB 90159-001 ..... $190; 8MB 90159-002 ..... $357
  - 16MB 90159-003 ..... $712; 32MB 90159-004 $1220
- Bravo 586-SX, 90/286, 386
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- Bravo 3/25s
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- Advantage! Pro 486/33/8, SX/25
- Bravo LC, LC II, LP and MT
  - 2MB 90987-001 ..... $86; 4MB 90987-002 ..... $159; 16MB 90987-004; 32MB 90987-005

COMPA

- Presario 500, 700 and 900 series
  - 4MB 147532-001 ..... $159; 8MB
  - 16MB 147524-001 ..... $549; 32M
- ProLinea 5/25s, 5/25n
  - 2MB 141798-001; 8MB 141742-001
- Presario 600 and 800 series, ProLinea
- ProLinea MT and ProLinea Enhanced
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  - 1MB Module 131313-001; 4MB Module 131152-001
- DeskPro 386s/16
  - 1MB Module 113646-001; 4MB Module 112154-001; 4MB Board 113634-001
- DeskPro 5/25s, 33s, 4/25SL, 33s, 66, 2
- 20N, SystemPro LT and M Series
  - 1MB 138688-001 ..... $49; 2M
  - 4MB 138686-001 ..... $170; 8M
- DeskPro 386-55, 486-33, SystemPro a
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- 4-16MB w/4MB 54F5011 (use 72-pin) $299

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- Ready 425, 433
  - 4MB n/a ..... $149; 16MB n/a $559
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ST31200N	1 05GB	9MS	SCSI-2	560
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ST12400N	2 1GB	9MS	SCSI-2	1015
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MC1936	3 0GB	11MS	SCSI-2	1629
MC3243	4 3GB	8MS	SCSI-2	1999
MC1991	9 0GB	11MS	SCSI-2	3289
MC4110AV	1 0GB	8 5MS	SCSI-AV	629
MC2217AV	1 7GB	10MS	SCSI-AV	962
MC4221AV	2 05GB	8 5MS	SCSI-AV	1425
MC1936AV	3 0GB	11MS	SCSI-AV	1699
MC3243AV	4 3GB	8 5MS	SCSI-AV	2099
MC1991AV	9 1GB	10MS	SCSI-AV	3449

WESTERN DIGITAL
FACTORY NEW-3 YEAR WARRANTY

AC2420	420MB	12MS	IDE	$197
AC2540	540MB	11MS	IDE	233
AC2700	730MB	10MS	IDE	289
AC31000	1083MB	10MS	IDE	445

IBM STANDARD

94G8488	364MB	12MS	SCSI	$219
94G2441	527MB	12MS	SCSI	265
94G8512	728MB	12MS	SCSI	350
70G8492	1052MB	8 6MS	SCSI	599
70G8493	2040MB	9 2MS	SCSI	1139
90F0780	4250MB	11MS	SCSI	2149
70G8487	270MB	12MS	IDE	177
70G8488	364MB	12MS	IDE	193
70G8486	527MB	12MS	IDE	246
70G8511	728MB	12MS	IDE	325
70G8512	1052MB	8 6MS	IDE	569

IBM PS/2
PS/2 50, 50Z, 80, 70, 80, P70, 55SX

200MB	15MS	IDE	349
420MB	13MS	IDE	399
540MB	12MS	IDE	499
540MB	12MS	SCSI	499
1 2GB	12MS	SCSI	799

MICROCHANNEL CONTROLLER
IDE 169 SCSI-2 $179

IBM PS/2 INTERNAL DRIVE KITS
30-8080,30-286,25-8086, 25-280

210MB	IDE	$299
420MB	IDE	399
540MB	IDE	499
1 0GB	IDE	799

digital
FACTORY NEW-2 YR FULL WARRANTY
DISK DRIVES FOR POWER USERS

DSP3107	1 0BG	9 5MS	SCSI-II	$690
DSP3210	2 1GB	9 5MS	SCSI-II	1200
DSP5300	3 5GB	12MS	SCSI-II	1800
DSP5350	3 5GB	12MS	SCSI-II	2200

Quantum
FACTORY NEW - 2 YEAR WARRANTY
5 YR WRN. ON P DRIVES/1 YR. WRN. ON 2.5" DRVS

MV270A	270MB	14MS	IDE	$168
LT365A	365MB	11MS	IDE	184
LT540A	541MB	11MS	IDE	232
LT730A	731MB	11MS	IDE	292
LT365S	365MB	11MS	SCSI-2	209
LT540S	541MB	11MS	SCSI-2	247
LT730S	731MB	11MS	SCSI-2	319
IMP1080S	1 08GB	9MS	SCSI-2	545
IMP1440S	1 4GB	9 5MS	SCSI-2	699
IMP2160S	2 1GB	9 5MS	SCSI-2	949
GP2140S	2 1GB	8 6MS	SCSI-2	1269
GP4280S	4 2GB	8 6MS	SCSI-2	2399

HEWLETT PACKARD
FACTORY NEW- 5 YEAR WARRANTY

1 0GB	10MS	SCSI	$694
2 1GB	8 9MS	SCSI	1340

Maxtor
FACTORY NEW-2 YEAR WARRANTY

M7270AV	270MB	12MS	IDE	$159
M7420AV	420MB	12MS	IDE	195
M7540AV	540MB	12MS	IDE	244
MXT540A	540MB	8 5MS	SCSI	345
MXT540S	540MB	8 5MS	SCSI	345
DR3410	105MB	MBL MAX	PCMCIA	360

CONNER
FACTORY NEW-1 YEAR WARRANTY

CFS210A	210MB	14MS	IDE	$164
CFS420A	420MB	13MS	IDE	203
CFA540A	540MB	12MS	IDE	267
CFA850A	850MB	10MS	IDE	405
CNR1275A	1 3GB	10MS	IDE	534
CFP1060S	1 06GB	9MS	SCSI-2	545
CFP2105S	2 1GB	9MS	SCSI-2	1015
CFP2107S	2 1GB	9MS	SCSI-2	1219
CFP4207S	4 2GB	9MS	SCSI-2	1425

FUJITSU
FACTORY NEW-5 YEAR WARRANTY

M2684	530MB	13MS	IDE	$225
M2684S	530MB	13MS	SCSI	238
M2694ESA	1 2GB	10MS	SCSI	525

WIDE SCSI HARD DRIVES

IBM

0662S12W	1 05GB	8 6MS	LP3 5	$725
D664W	2 04GB	9MS	3 5	1279
0664ESH	4 25GB	11MS	FH	2279

Seagate

ST31200W	1 05GB	9MS	3 5	$749
ST12550W	2 13GB	8MS	3 5	1379
ST15150W	4 29GB	8MS	3 5	CALL

MICROPOLIS

MC2217DW 1750MB 10MS 3 5 $975

NOTEBOOK HARD DRIVES

TOSHIBA
NOTEBK DRIVES/1 YEAR WARRANTY ON 2.5"

MK1522FC	126MB	15MS	IDE	$199
MK2224FC	213MB	15MS	IDE	275
HDDNB258	258MB	15MS	IDE	295
MK2326FC	340MB	15MS	IDE	344
MK2428FC	524MB	15MS	IDE	524
MK2528SE	700MB	15MS	IDE	880

IBM STANDARD

IBMHDN250	250MB	IDE	$284
IBMHDN340	340MB	IDE	374
IBMHDN520	520MB	IDE	524

Seagate

ST9145AG	128MB	16MS	$275
ST9150AG	128MB	16MS	275
ST9235AG	210MB	16MS	275
ST9385AG	391MB	16MS	349
ST9550AG	455MB	16MS	479
ST9655AG	520MB	16MS	499

Quantum

GLS256AT	256MB	16MS	$295
GLS256S	256MB	16MS	295
OT512	512MB	17MS	439

REMOVABLES/OPTICALS

SYQUEST
REMOVABLE CARTRIDGE DRIVES

SQ555 44MB INTERNAL/EXTERNAL	$235/[illegible]
SQ5110C 88MB C INTERNAL/EXTERNAL	[illegible]
88MB C EXTERNAL W/CART & CABLES	[illegible]
SQ3105A 105MB INTERNAL IDE	[illegible]
SQ3105S 105MB SQSI	[illegible]
105MB EXTERNAL W/CART	[illegible]
270MB INTERNAL/EXTERNAL FOR PC	349/[illegible]
270MB EXT FOR MACINTOSH	[illegible]
270MB CART SINGLES/5 PACK	[illegible]
CARTS 44MB/88MB/105MB	63/[illegible]
5200 200MB INTERNAL	[illegible]
5200 200MB EXTERNAL W/CART	[illegible]

MAXOPTIX
1-GB & 1.3GB REWRITABLE OPTICAL DRIVES

TAHITI IIM 1GB INT/EXT	$2,259/[illegible]
TAHITI IIM 4GB INT/EXT	2,399/2,5[illegible]
1/1 3GB CARTRIDGE GLASS/POLY	179/[illegible]

HEWLETT PACKARD
1-GB & 1.3GB REWRITABLE OPTICAL DRIVES

C1716T 1 3GB INTERNAL/EXTERNAL	$2 199/2,4[illegible]
1 3GB DR 650 NB CARTRIDGE	14[illegible]

FUJITSU
REWRITABLE EXTERNAL OPTICAL DRIVES

230MB 3 5" OPTICAL DRIVE INT	[illegible]
230MB 3 5" OPTICAL DRIVE EXTERNAL W/CART	[illegible]
230MB CARTRIDGE 1-PACK $69 5-PACK	[illegible]

FLOPPY DRIVES

TEAC

1 44MB	[illegible]
1 2MB	[illegible]
DUAL FLOPPY 1 44 & 1 2	[illegible]

SIMMS
- LIFETIME WARRANTY/
- MONEY BACK GUARANTEE
- BUY WITH CONFIDENCE FROM THE MEMORY UPGRADE EXPERTS
- PERSONAL COMPUTERS • WORK STATIONS • NOTEBOOKS • LASER PRINTERS
- GREAT SERVICE • FAST DELIVERY • SUPER SELECTION • BIG SAVINGS
- GET IT EXPRESS FROM THE MEMORY SUPER SOURCE

4MB X 9-80NS SIMM	$140	256K X 9-80NS SIMM	14	256K X 9-70NS SIPP	20
4MB X 9-70NS SIMM	145	256K X 9-70NS SIMM	15	256X36-1MB-70NS	55
4MB X 9-60NS SIMM	150	256K X 9-60NS SIMM	18	512X36-2MB-70NS	95
1MB X 9-100NS 9 CHIP SIMM	38	1MB X 8-80NS SIMM	40	1X36-4MB-70NS/60NS	179/189
1MB X 9-60NS 3 CHIP SIMM	39	1MB X 8-70NS SIMM	42	2X36-8MB-70NS/60NS	348/358
1MB X 9-80NS 9 CHIP SIMM	44	4MB X 8-80NS SIMM	135	4X36-16MB-70NS/60NS	575/595
1MB X 9-70NS 3 CHIP SIMM	40	4MB X 8-70NS SIMM	140	8X36-32MB-70NS/60NS	1245/1295
1MB X 9-70NS 9 CHIP SIMM	45	1MB X 9-100NS SIPP	43	16X36-64MB-70NS/60NS	2395/2435
1MB X 9-60NS 3 CHIP SIMM	42	1MB X 9-80NS SIPP	49	1X32-4MB-70NS/60NS	155/165
1MB X 9-60NS 9 CHIP SIMM	46	1MB X 9-70NS SIPP	50	2X32-8MB-70NS/60NS	299/319
16MB X 9-70NS SIMM	595	1MB X 9-60NS SIPP	51	4X32-16MB-70NS/60NS	499/520
16MB X 9-60NS SIMM	635	256K X 9-100NS SIPP	18	8X32-32MB-70NS/60NS	1095/1135
256K X 9-100NS SIMM	13	256K X 9-80NS SIPP	19	16X32-64MB-70NS/60NS	2295/2335

DYNAMIC RAMS

1MB X 1-100NS	$6 00	256K X 1-80NS	3.75
1MB X 1-80NS	6.25	256K X 1-70NS	3.75
1MB X 1-70NS	6.00	256K X 1-60NS	3.75
1MB X 1-60NS	6.75	256K X 4-100NS	8.00
256K X 1-150NS	5.00	256K X 4-80NS	8.25
256K X 1-120NS	3.25	256K X 4-70NS	8.00
256K X 1-100NS	3 00	256K X 4-80NS	8.75

CACHE MEMORY

8 X 8-15	$5.00	32 X 8-20	8.00
8 X 8-20	4.50	32 X 8-25	7.00
8 X 8-25	4.00	64 X 1-15	15.00
16 X 4-15	6.00	64 X 4-20	10.00
16 X 4-20	5.50	64 X 4-25	8.00
16 X 4-25	5.00	128 X 8-20	33.00
32 X 8-10	10.00	128 X 8-25	30.00

CPU'S

INTEL		486DX2-66	107	PENTIUM 60	582	486DX2-66	100
386DX-33	$33	486DX-50	332	PENTIUM 90	564	CYRIX	
486SX-25	70	486DX2-66	220	AMD		486 DX-33	$131
486 SX-33	110	486DX4-75	483	386DX-40	$45	486 DX2-40	133
486DX-20	120	486DX4-100	502	486DX-40	100	486 DX-50	151
486DX-33	150	PENTIUM 66	470	486DX2-50	76		

MATH CO-PROCESSORS

INTEL	80287-10 10MHZ 75	80387DX-16 16MHZ 75	CYRIX	83S87SX16 16MHZ 60	2C87-10 10MHZ 54	3087-33 33MHZ 50
8087 5MHZ $40	80287XL 10MHZ 70	80387DX-20 20MHZ 75	83D87DX-16 16MHZ 50	83S87SX20 20MHZ 60	2087-12 12MHZ 60	3087-40 40MHZ 50
8087-2 8MHZ 130	80287XLT 12MHZ 75	80387DX-25 25MHZ 76	83D87DX-20 20MHZ 50	83S87SX25 25MHZ 60	2087-20 20MHZ 64	3S87SX-16 16MHZ 60
8087-1 10MHZ 80	80387DX-16 16MHZ 75	80387DX-33 33MHZ 75	83D87DX-25 25MHZ 50	82S87XL 60	3087-16 16MHZ 50	3S87S3-20 20MHZ 60
80287-6 6MHZ 40	80387SX-20 20HZ 75	80487SX-25 345	3087DX-33 33MHZ 50	IIT	3087-20 20MHZ 50	3S87SX-25 25MHZ 50
80287-8 8MHZ 50	80387SX-25 25HZ 75		83D87DX 40 40MHZ 60	2087-8 8MHZ 54	3087-25 25MHZ 50	3S87SX-33 33MHZ 50

TAPE BACKUPS

COLORADO MEMORY SYSTEMS

Jumbo 250 Internal	$165
Jumbo 350 Internal	179
Jumbo 700 Internal	334
Trakker 250 parallel port	299
Trakker 350 parallel port	348
Trakker 700 parallel port	516
Powertape 2 4GB SCSI Internal	927
Powertape 2 4GB SCSI External	1077
PowerDAT 4GB SCSI Internal	1127
2120 CARTS SNG/5PK	19/89
2120 CARTS D80 SNG/5PK	21/99

CONNER

TapeStor 250MB Internal	$151
TapeStor 250MB Ext Par A250ep	339
TapeStor 420MB Internal	187
TapeStor 420MB Parallel Port	337
TapeStor 850MB Internal	288
TapeStor 820MB Parallel Port	429
C2150S 250MB DC6000, 6MB/MIN, BARE INT/EXT	339/439
C2525S 525MB DC6000, 14MB/MIN, BARE INT/EXT	469/569
C4320 2GB DAT, 11MB/MIN BARE INT/EXT	799/899
C4340 4-8GB TURBO DAT 88MB/MIN BARE INT/EXT	999/1,099

WangDAT.

3100 2 0GB TAPE TAPE INT/EXT	849/949
3200 4-8GB TAPE TAPE INT/EXT	899/999
3400DX 4-8GB TAPE TAPE INT/EXT	999/$1,099

EXABYTE

FS1G 1 5GB TAPE INT/EXT	$795/$949
4200 2GB TAPE INT/EXT	849/959
4200C 4GB TAPE INT/EXT	829/899
8205 2 5GB TAPE INT/EXT	1,325/1,549
8200 2 5GB TAPE INT/EXT	1 379/1 679
8505 5GB TAPE INT/EXT	2,025/2 399
8500 10GB TAPE INT/EXT	2,269/2,399
AUTOCHANGER 48GB TAPE EXT	5,595
5 PACK TAPES FOR FS1G	199
5 PACK TAPES FOR FS10G	89

IOMEGA

Iomega Tape250 Internal Basic	$169
Iomega Tape250 Insider Half-height	189
Bernoulli 5 25" 90MB cart gold	99
Bernoulli 90 OR w/cart	345
Bernoulli 150MB Internal SCSI	413
Bernoulli 150MB Internal IDE	389
Bernoulli 150MB PC Powered	449
Bernoulli 150MB Transportable	469
Bernoulli 230MB Insider	454
Bernoulli 230MB Transportable	454
150MB Cartridge	92
230MB Cartridge	99

MicroSolutions
BACKPACKS

SPEED PARALLEL PORT CD ROM DRIVE	$339
250 TAPE DRIVE (Req min DOS 3 0)	329
DSKTTE DRV 1 2, 5 25 (Reqrd min DOS 2 0)	155
DSKTTE DRV 1 4, 3 5 (Reqrd min DOS 2 0)	145
HARD DRIVE 420 (Rqrd min DOS 3 0)	469

Mountain

Multi-Sound Monterey	$158
FS8500 305MB IDE Internal	313
SideCar II 305MB Parallel	313
1200-4 4GB SCSI External	2045

HEWLETT PACKARD

35470A 2.0GB TAPE INT/EXT	$799/899
35480A 4-8GB TAPE INT/EXT	889/999
C1533A 4-16GB TAPE INT/EXT	1,099/1,199
4MM 90MM DAT CART (1/5 PK)	18/$86
3.5"-5 25" CONVERSION KIT	39

MULTIMEDIA

Creative Labs

Sound Blaster Value	$59
Sound Blaster Pro Value	$79
Sound Blaster 16 Value	$99
Sound Blaster 16 MCD	$139
Sound Blaster MCD w/ASP	$139
Sound Blaster SCSI	$179
Sound Blaster SCSI w/ASP	$199
Sound Blaster AWE 32	$279
Sound Blaster Discovery CD16	$239
Sound Blaster Entertainment	$399

Media Vision

Pro Movie Studio	$179
MV 0400	289
MV 2000	319
MV 3000	369
MV 4000	499
MV 5000	699

CD ROMS

NEC

NEC 2VI	$179
NEC 2V Deluxe	285
NEC 3XP Plus/PlusKit	399/469
NEC 4XI Plus/Plus Kit	399/469
NEC 4XE Plus/Plus Kit	499/559
NEC 4XE Pro	679

PLEXTOR

3028 Internal/External	$259/355
4 Plext 256K Internal/External	359/469
4 Plext 1MB Internal/External	405/515

PIONEER

DRM604X 4 X 6 disc	$979
DRM1804X 4 X 18 disc	1969

TOSHIBA

3501 SCSI 2X Internal/External	$289/399
3501 SCSI 4X Internal/External	355/445

CHINON

535 Double Speed SCSI II Int/Ext $249/349

SONY

CDU-33A 2X Internal	$129
CDU-55S SCSI 2X Internal	199

VIDEO BOARDS

DIAMOND Computer Systems, Inc

Speedstar Pro 1MB ISA	$105
Speedstar Pro 1MB VLB	105
Speedstar 64 1MB ISA	149
Speedstar 64 2MB ISA	195
Stealth 64 DRAM 1MB VLB	149
Stealth 64 DRAM 1MB PCI	149
Stealth 64 DRAM 2MB VLB	199
Stealth 64 VRAM 2MB PCI/VLB	329
Stealth 64 VRAM 4MB PCI/VLB	469
Viper SE 2MB VLB	319
Viper SE 2MB PCI	319
Viper SE 4MB VLB	469
Viper SE 4MB PCI	469

BOCA RESEARCH INC

Voyager 1MB VL-Bus	125
Voyager 2MB VL-Bus	195
SVGAP1 PCI SuperX VGA 1MB	125

#9GXE Number Nine Computer Corporation

LVL 10 ,1MB ISA/VLB	$239/249
LVL 11, 2MB ISA/VLB	349/349
LVL 12 3MB ISA/VLB	429/429
LVL 14, 4MB ISA/VLB	679/679
GXE64 PCI 1MB/2MB	175/249
GXE64 VLB 1MB/2MB	175/249
GXE64 Pro PCI	355

ATI

Graphics Wonder VLB 1MB	$154
Graphics Xpression 2MB ISA	235
Graphics Xpression 2MB VLB	235
Graphics Xpression 2MB PCI	235
Graphics Ultra Pro 2MB ISA	279
Graphics Ultra Pro 2MB VLB	279
Graphics Pro Turbo 2MB ISA	379
Graphics Pro Turbo 2MB VLB	379
Graphics Pro Turbo 2MB PCI	379
Graphics Pro Turbo 4MB ISA	596
Graphics Pro Turbo 4MB VLB	596
Graphics Pro Turbo 4MB PCI	599

Hercules

Stingray VL 1MB VLB	$109
Stingray PCI 1MB PCI	109
Graphite ISA 1MB HG210	195
Dynamite Pro 2MB ISA	195
Dynamite Pro 2MB VLB	195
Dynamite Power 2MB VLB/PCI	209
Graphite Power ISA 1MB PG310	229
Graphite Power VLB 1MB PG610	229
Graphite Power ISA 2MB PG420	335
Graphite Power VLB 2MB PG720	335
Graphite Power PCI 1MB/2MB	229/339

ORCHID

Kelvin 64 1MB ISA/PCI/VLB	$149
Kelvin 64 2MB ISA/PCI/VLB	199
Kelvin EZ 1MB ISA/PCI/VLB	119
Fahrenheit 64 1MB VLB/PCI	149
Fahrenheit 64 2MB VLB/PCI	195
Fahrenheit PRO 64 2MB VLB/PCI	299
Fahrenheit PRO 64 4MB VLB/PCI	459

MONITORS

MAG

15"	DX15F	344
15"	MX15F	459
17"	DX17F	643
17"	MX17F	799
17"	MX17FG	829
21"	MX21F	1686

CTX

14"	6439ES	$224
14"	6468ES	224
14"	6468GM	239
14"	1451ES	245
14"	1451GM	255
14"	1462ES	279
14"	1462GM	289
15"	1562GM	319
15"	1565GM	339
17"	1765GM	639
17"	1785GM	699

NEC

14"	SVGA	$309
14"	2V	304
15"	3V	469
15"	MultiSync XE15	529
17"	MultiSync XE17	969
21"	MultiSync XE21	1929
15"	MultiSync XP15	629
17"	MultiSync XP17	1239
21"	MultiSync XP21	2449

NOKIA

14"	44BS	$399
15"	449E	499
15"	447L	695
17"	447X	1029
17"	447X/TCD	1159
21"	445X	2199

PANASONIC

14"	C11491	$279
17"	C11791E	749

HITACHI

15"	Pro15	$429
15"	SuperScan 15s	399
17"	SuperScan 17s	779
17"	SuperScan 17 Elite	999
17"	NS1764	729
17"	CM1797	949
20"	CM2095	1199
20"	CM2098	1529
21"	CM2198	1829

ViewSonic

14"	14EX	$289
15"	15G	389
15"	V15	389
15"	15EX	399
17"	17E	399
17"	17G	759
17"	V17	839
20"	20G	1399
20"	V20	1499
21"	V21	1679

MAGNAVOX

14"	M479 (mono)	$104
14"	CM2089	228
14"	CM2099	248
15"	CM2015	268
15"	CM4015	348
17"	CM4018	679
20"	20CM64	1028

NANAO

15"	F34i non int flat	$629
17"	F550	899
17"	F560i Green	1155
17"	T560i 25 dpi	1385
21"	F760iW	1879
20"	T660i	2065
21"	F760i 31 dpi	1885
21"	F780iW flxscn n/cd	3200

SONY

15"	CPD-15SF1	$459
17"	GDM-17SF	899
17"	GDM-17SE1	999
20"	GDM-20SE1	1949

SCSI-IDE CONTROLLERS

FUTURE DOMAIN

TMC850	8-Bit w/Bio	$59
TMC1670	SVP 16-Bit SCSI Value Pack	129
TMC1680	SVP 16-Bit Value Pack 7HD/4FD	129
SCSI 2 GO	PCMCIA Fast SCSI-2 Type2	279
TMC3260	32 Bit PCI Kit	149
TMC3260	SVP Value Pack	149
TMC7000EX	32 Bit EISA SVP Kit Floppy	369

adaptec

1505	CD ROM 16-Bit SCSI Card Kit	$75
1515	16 Bit ISA-SCSI 2 KIT	99
1522	16 Bit 7HD/2FD Kit	139
1542	Bus MasterCard Only	210
1542CF	Bus Master Complete Kit	249
1542G+	Bus Mstr Compl Kit w/Corel SCSI	314
1640	MicroChannel for PS/2, 7HD	299
1570	ISA-SCSI AUDIO KIT	299
2940	PCI-FAST SCSI KIT	294
2742	EISA KIT 14HDs	369
2742W	FAST WIDE SCSI CARD	399
2842A	VLFast SCSI-II VESA	259
APA-460	Slim SCSI PCMCIA SCCSI Card	289
APA-2940W	PCI Fast-Wide SCSI Kit	389
AMM-1570	FullSCSI w/Advanced Audio	319

BUSLOGIC

BT445S	VESA Local Bus Kit	$199
BT545KT	BusMaster Fast Scsi	229
BTB747AK	EISA Fast SCSI Kit	379
BT757S	SEISAWIDE SCSI (SINGLE S)	375
BT946C	Bus Master Fast SCSI for PCI	269

TRANTOR

T130	8-Bit SCSI	$85
T348	Parallel Port to SCSI Plus	149
T358	Parallel Port to SCSI Plus Enhnc	199

Q logic

Fast!SCSI EISA	$179
Fast!SCSI EISA FL floppy connector	199
Fast!SCSI ISA	149
Fast!SCSI ISA FL floppy connector	169
Fast!SCSI VESA Local Bus	199
Fast!SCSI PCMCIA	199
Fast!SCSI PCI	299

DTC

2278VL IDE/FDD/1P/1S/1G	$25
2277VL VL-Bus Caching IDE (Up to 16 MB)	139
2130PC PCI/IDE	29
2280 IDE/FD/1 P/2S/1 G	29
2290 EISA IDE 32-Bit	137
3270VL SCSI-2 VL-BUS FDD/HDD	119
3280AS SCSI-2/4-FDD	119
3290AS EISA SCSI-2/4-FDD	339
CD-ROM Kit SCSI 26 Bit	47

Acculogic

ISAport	16bit SCSI-Kit Model 20	$129
VESAport	32bit VLB Kit w/Corel SCSI M/20	249
PCIport	Model 20 w/wide SCSI-3 Support	249
PCIport	Model 40 w/wide SCSI-3 w/Core SCSI	299

SCSI ACCESSORIES

HARD DRIVE EXTERNAL CABLES

CENTRONICS 50 TO SCSI-II	[illegible]
CENTRONICS 50 TO MAC 25-PIN	[illegible]
CENTRONICS 50 TO CENTRONICS	[illegible]
CENTRONICS 50 TO CENTRONICS 50 6FT	[illegible]
CENTRONICS 50 TO CENTRONICS 50 3FT	[illegible]
CENTRONICS TO DB-50	[illegible]
DB-50 TO SCSI-II	[illegible]
DB-50 TO DB-50	[illegible]
SCSI-II TO SCSI-II	[illegible]
FAST WIDE SCSI II TO CENTRONICS	[illegible]

HARD DRIVE INTERNAL CABLES

SCSI 50-PIN RIBBON 3 CONNS 2 DEVICE	[illegible]
SCSI 50-PIN RIBBON 4 CONNS 3 DEVICE	[illegible]
SCSI 50-PIN RIBBON 5 CONNS 4 DEVICE	[illegible]
SCSI 50-PIN RIBBON 8 CONNS 7 DEVICE	[illegible]
IDE 40-PIN RIBBON 3 CONNS	[illegible]
FLOPPY & IDE CABLES SET	[illegible]

MODEMS

US Robotics

Sportster 28 8/28 8, V 34 Internal	$23[illegible]
Sportster 28 8/28 8, V 34 External	[illegible]
Sportster 28 8/28 8, V Fast External	[illegible]
Sportster 28 8/28 8, V Fast Internal	[illegible]
Sportster 14 4/14 4 External	[illegible]
Sportster 14 4/14 4 Internal	[illegible]
Worldport 14 4/14 4 Pocket	[illegible]
Courier V 34 28 8/28 8 External	[illegible]
Courier V 34 28 8/28 8 Internal	[illegible]

PRACTICAL PERIPHERALS

14 4/14 4 Int Proclass	[illegible]
14 4/14 4 Ext Proclass	[illegible]
28 8/14 4 Int Proclass	[illegible]
28 8/14 4 Ext Proclass	[illegible]
14 4/14 4 Int Series II	[illegible]
14 4/14 4 Ext Series II	[illegible]
28 8/14 4 Int Series II	[illegible]
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Accura 14 4 Internal w/fax	[illegible]
Accura 28 8 V 34 Internal w/fax	[illegible]
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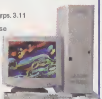

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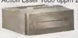

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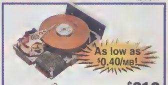

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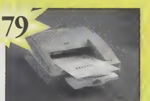

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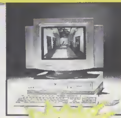

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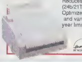

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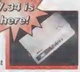

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1057035 (512K)	P/S1-286	49 00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	109 00
92F9694 (4Meg)	P/S1 & P/S1/386SX Model-2121	189 00
92G7200 (4Meg)	PSI Expert, Consultant Willow	175 00
92G7201 73G3131 (4Meg)	Value Point Performance PC Server 4/66	175 00
73G3132/92G7203 (8Meg)	Value Point Performance, PC Server 4/66	339 00
60G1622/92G7294 (16Meg)	Value Point Performance PC Server 4/66	609 00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1239 00
6450902 (2Meg)	56, 57, 57SX 90 95 P-75 57SLC Value Point 77 486DX2, 486SX, SVR 85	90 00
6450128/92G7200 (4Meg)	57SX 90 95 P-75 57SLC 56, 56SLC, P/S1 386SX Mod-2123 2133 2155 Val Pt 77, 486CS2 486SX, SVR85 Value Point 77 486DX2 486SX, SVR 85	175 00
6450129/92G7428 (8Meg)	35SX 40SX	339 00
6450130/92G7202 (8Meg)	56 57 57SX 90 95, P-75 57SLC Value Point 77 486DX2 486SX, SVR 85	339 00
6451158 (4Meg ecc)	486 95XP 95A (install in pairs)	199 00
6451159 (8Meg ecc)	486 95XP 95A (install in pairs)	399 00
(16Meg ecc)	9595 OPT	749 00

IBM NOTEBOOK & LAPTOP MEMORY

8189098 (4Meg)	Thinkpad 500, 510CS (3 3 volt)	209 00
8189099 (8Meg)	Thinkpad 500 510CS (3 3 volt)	389 00
8189113 (16Meg)	Thinkpad 510CS (3 3 volt)	869 00
79F0999 (2Meg)	LX40 N33SX PS Note	103 00
79F1000 (4Meg)	LX40 N33SX, PS Note Tkpd 350, 350c, PS Note 425	189 00
79F1001 (8Meg)	LX40 N33SX, PS Note	369 00
07G1415 (4Meg)	Thinkpad 750, 750c 755 360 355, 340, 450	209 00
07G1416 (8Meg)	Thinkpad 750, 750c 755 360 355 340, 450	389 00
66G0094 (16Meg)	Thinkpad 750 750c 755 360 355 340 450	849 00
07G1420 (4Meg)	CL57LSX LpTp Thinkpad 700 700C 720 720C	209 00
07G1421 (8Meg)	CL57LSX LpTp Thinkpad 700 700C, 720 720C	389 00
60G0378 (8Meg)	Thinkpad 350 350c PS Note 425	319 00
60G0379 (16Meg)	Thinkpad 350 350c, PS Note 425	569 00
92F8804 (2Meg)	N45SL	109 00

COMPAQ MEMORY MODULES

MODEL	AMT UPGRADES	CMPQ PART #	PRICE
DeskPro 386/33 386/33L,	2Meg Module	115144 001	109 00
486/25, 486/33L	8Meg Module	116561-001	399 00
486/50L System Pro	32Meg Module	116568-001	1399 00
DeskPro 386/33L, 486/33L	(Exp Bd)	116569-001	279 00
DeskPro 386/25 386/20	1Meg Module	113131-001	79 00
	4Meg Module	113132-001	199 00
DeskPro 386S-16MHz	1Meg Exp Bd	113633-001	149 00
	4Meg Exp Bd	113634-001	279 00
	1Meg Module	113646-001	79 00
	4Meg Module	112534-001	199 00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149 00
DeskPro 386/25E	4Meg Exp Bd	113645-001	279 00
	1Meg Module	113131-001	79 00
	4Meg Module	113132-001	199 00
DeskPro 286N, 386N 386SX20, all "M" series sytem LT series, all "I" series	1Meg Module	118688-001	59 00
	2Meg Module	118689-001	89 00
	4Meg Module	118690-001	169 00
	8Meg Module	128677 001	339 00
M Series Exp Bd	0-64Meg	129160-001	189 00
DeskPro 386/16	1Meg Kit	108071-001	99 00
	4Meg Kit	108072-001	299 00
	1-2Meg Exp Bd	108069-001	239 00
	4-8Meg Exp Bd	108070-001	437 00
DeskPro 286	512K Kit	113012-001	49 00
DeskPro 5/60, 5/66M, 5/66M (ALL OF THESE MACHINES USE THESE MODULES)	8Meg Kit	149911-001	389 00
Prosignia 5/60	16Meg Kit	149949-001	899 00
Proliant 100 5/60	32Meg Kit	149912-001	1356 00
Proliant 2000 4/30, 5/66	64Meg Kit	149913 001	2516 00
Proliant 4000 4/50, 5/66	128Meg Kit	149914-001	5799 00
Prolinea 386 3/25S, 3/252S	2Meg	141738-001	90 00
	8Meg	141742-001	316 00
Prolinea 486 4/25S, 4/33, 4/50 4/66, COS	2Meg	141863-001	95 00
Enhanced Prolinea, Prosario series	4Meg	141684-001	175 00
	8Meg	141685-001	339 00
Prosignia PC Server 486/33, 486 DX2/66	8Meg	141685 001	339 00
	16Meg	149320-001	599 00
	32Meg	149147-001	1199 00

COMPAQ LAPTOPS & NOTEBOOKS

LTE/286	4Meg Bd	117081-003	179 00
LTE/386S/20	4Meg Module	121125-002	209 00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	209 00
LTE LITE/20 25, 25C	8Meg Module	129769-003	409 00
LTE LITE/20 25, 25C	16Meg Module	129769-004	809 00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	189 00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	349 00
LTE LITE 425C/33C/25E/25L	16Meg Module	142337-004	718 00
SLT/286	4Meg Module	110237-001	199 00
SLT/386	2Meg Module	118304-001	109 00
SLT/386	4Meg Module	118305-001	219 00
Concerto LTE Elite	4Meg	144790-001	189 00
	8Meg	144790-002	369 00
	16Meg	144790-003	719 00
Contura 320, 325	2Meg	139497 001	99 00
	4Meg	139498-001	189 00
	8Meg	139499-001	339 00
Contura 400	4Meg/8Meg/16Meg		209/389/719
Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	189 00
	8Meg	146521-001	339 00
	16Meg	146531-001	899 00
Aero 4/25 4/33L	4Meg	190532-001	184 00
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T2000/T2000SX	2Meg	PC18 PA8317U	89 00
T2000SX/T1000LE	4Meg	PC-PA8314U	189 00
T2000SX/T1000LE	8Meg	PC14-PA8315U	359 00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	89 00
T2000SXE/2200SX/T1800 1850, C	4Meg	PC-PA2001U	189 00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	359 00
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	189 00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	359 00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	699 00
T4500 C T4600, T4700 T1900 C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	199 00
T4500 C T4600 T4700 T1900 C T1910, T1950 (3.3 v)	8Meg	PC PA2013U	379 00
T4500 C, T4600 T4700 T1900 C T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	769 00
T3300SL	6Meg	PC-PA2008U	268 00
T3300SL	16Meg	PC-PA2009U	699 00
T3400CT, T2400, T3600	4Meg	PC-PA2019U	194 00
T3400CT, T2400, T3600	8Meg	PC-PA2020U	369 00
T3400CT, T2400, T3600	16Meg	PC-PA2021U	763 00
T3400CT	32Meg		1549 00
T1200XE	2Meg	PC13-PA8306	99 00
T1600	2Meg	PC8-PA8302U	99 00
T3100	2Meg	PC3-PA7135E	139 00
T3100e	2Meg	PC9-PA8340U	109 00
T3100SX	2Meg	PC15-PA8308U	109 00
T3100SX	4Meg	PC15-PA8310U	189 00
T3200	3Meg	PC6-PA7137U	185 00
T3200SX	2Meg	PC12-PA8307U	119 00
T3200SX	4Meg	PC12-PA8909	199 00
T3200SXC	2Meg	PC19-PA8318U	119 00
T3200SXC	4Meg	PC19-PA8319U	199 00
T5100	2Meg	PC7-PA8301U	95 00
T5200/T8500	2Meg	PC10-PA8304U	114 00
T5200/T8500	8Meg	PC10-PA8313U	419 00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT UPGRADED	MANU PART #	PRICE
ACER 730, 735C, 780	2Meg/4Meg/8Meg		109/209/399
ACER 750	4Meg/8Meg/16Meg		199/459/799
ALR Venture	4Meg	12407980	249 00
AST Ascentia 900N 800N	4Meg/8Meg/16Meg		199/379/679
AST Bravo & Explorer	4Meg/16Meg	501255-001 -002	169/679
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	189 00
AST Power Exec 3/25C, 425EL 425SL	4Meg/16Meg	501166-001, -003	199/899
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	194/769
AT&T Safari NSX/20	4Meg	PEC 37651	259 00
Bondwell B310, Plus	1Meg	23050-09100	109 00
Bondwell 8310V, SX	1Meg		109 00
Bondwell B310V, SX	4Meg		229 00
Brother HL-630 631, 641, 645	1Meg		CALL
Canon Innova 486	2Meg/4Meg/8Meg		109/209/449
Canon Innova 486-10	4Meg/16Meg		189/829
Canon Notejet 486	4Meg/ 8 Meg		199/389
Dell Lattitude	4Meg/16Meg		199/749
Epson Action Note 700	4Meg/16Meg		199/689
Epson NB3	4Meg	A808511	199 00
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	109 00
Gateway 2000 Colorbook 4/33	4Meg/16Meg		199/679
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		199/1199
Gateway 2000 486 Handbook	4Meg/16Meg		199/679
Goldstar GS520 386SX/16	4Meg	S386-4M	249 00
Grid 1720, 1750, 1755	1Meg		59 00
HP Omnibook 300, 430, 425	2Meg/4Meg		129/260
HP Omnibook 530	4Meg/8Meg/12Meg		239/449/819
Magnavox Metalis	1Meg/4Meg	286, 386SX	109/199
NCR Safari 3180	4Meg/ 8 Meg		239/449
NEC Prospeed 386	2Meg	PC31-21	119 00
NEC Prospeed 386	8Meg	PC31-22	399 00
NEC Prospeed 286 386SX-18, 386SX-20	1Meg	PC21-21 PC43-21	79 00
NEC Prospeed 286 386SX-16 386SX-20	4Meg	PC21-22, PC43 22	199 00
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NEC Versa Removable Hard Drive	340Meg/524Meg/710Meg		749/899/1049
NEC Versa S	4Meg/8Meg/16Meg		229/399/799
Packard Bell 386SX 286	1Meg 4Meg	286 386SX	109/199
Packard Bell Statesman	2Meg/8Meg		119/369
Panasonic CF170 CF270, CF370	1Meg	CF-BA165	59 00
Panasonic CF380, CF480	2Meg/4Meg/6Meg		119/199/309
Panasonic CF-V21P CF-580	4Meg/16Meg		219/819
Sanyo 17/18 NB	2Meg	MBC-NBMEM2	109 00
Sharp 6781 6881, 6785 6700, 6800, 6741	2Meg/4Meg		109/199
Sharp 8150, 8650, 8660, 7700, 7780	4Meg/16Meg		199/679
Sharp PC 6220	1Meg	CE 6218	79 00
Tandon, PC Brand, Dataworld	2Meg/8Meg	NB386SX-20	119/349
TI Travelmate 2000	1Meg	2568034 0001	79 00
TI Travelmate 3000	2Meg	2566996-1	64 00
TI 4000, TI 4000E	4Meg/16Meg		199/659
TI 4000M	4Meg/16Meg		219/899
Tandy 1510, 2810, 3810	1Meg		49 00
Tandy 2820, 3820, 3830	2Meg/4Meg/6 Meg		119/199/309
Twinhead, Altima, Compudyne 486SX, DX, Tandy 4860	4Meg/16Meg		199/679
Ultra 486 TS38	4Meg/8Meg/16Meg		249/459/899
Zeos 386SX Notebook (not the + version)	2Meg		109 00
Zenith Master Sport 386SX	2Meg	ZA-300-1	114 00
Zenith Master Sport SL, SLE, 600, 820, 625NL	2Meg	ZA-4-4	119 00
Zenith Super Sport 286 286E	1Meg	ZA-180 86	99 00
286E, SX	2Meg	ZA 180-64	149 00
SX Alpha	2Meg	ZA-180 86	149 00
SX Beta	2Meg	ZA-180 87	149 00
Zenith Z-Note 325L, LC	2Meg/8Meg	ZA3250-4/5	129/419
Zenith Z Note 425LN, LNC LNP	4/8/16Meg		209/469/639
Zenith Z Star 4/33	2/8Meg		119/369

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14 400/14 400 Data/Fax Modems	189	•Wavjammer™ (16 bit stereo sound card)	275
Readwriter Card	149	Type III 105 Mg Hard Drive	319
Lan Ethernet Combo	Call	Type III 130 Mg Hard Drive	409
Lan Ethernet (10 Base T)	169	Type III 170 Mg Hard Drive	449
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Canon LBP 860	–	–	–	99	–	–	179	–	–	349	669	1249
Canon LBP4, 4Lite 4plus	–	–	159	219	–	–	–	–	–	–	–	–
Epson 6000 Action Laser	–	–	–	139	–	–	229	–	–	–	–	–
Epson Action Laser II	–	–	89	–	208	–	–	327	–			
Epson 8000	–	–	89	–	208	–	–	327	–			
Epson 1000, 1500	–	–	–	*119**	–	–	*238**	–	*Call*			
HP 2, 2D	–	–	–	109	–	–	169	–	–	–	–	
HP 3 3D 3P, 2P 2P+	–	–	–	99	–	–	169	–	–	–	–	–
HP 4, 4M 4Si 4SIMX 4P 4MP	–	–	–	89	–	–	169	–	–	349	–	
HP 4L	–	–	59	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	69	–	–	–	189	–	–	349	–	
HP 4SI	–	–	–	89	–	–	175	–	–	349	–	–
HP Design Jet 600, 650	–	–	–	–	–	–	175	–	–	349	–	–
HP Deskjet 500 500C, 510 550,560	–	55	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	89	–	–	175	–	–	349	–	–
HP Paintjet XL300	109	–	–	–	–	–	289	–	–	489	837	–
IBM Laser 4019 4019E	–	–	–	–	–	169	–	–	–	–	–	–
IBM Laser 4029 4037	–	–	–	–	–	–	169	–	–	–	–	–
IBM Laser 4039 4079	–	–	–	99	–	–	169	–	–	350	–	–
NEC 90 290	–	–	–	139	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	99	–	–	–	–	–	–	–	–
Oki 400	–	–	–	64	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	135	189	–	–	–	–	–	–	–	–
Oki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
Packard Bell PB 9500	–	–	–	139	–	–	227	–	–	–	–	–
Packard Bell 9815	–	–	–	159	–	–	269	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	129	–	–	209	–	–	–	–	–
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–	–
Panasonic 4450	–	–	99	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	89	129	–	–	229	–	–	–	–	–
Panasonic 4440, 5410	–	–	109	179	–	–	Call	–	–	–	–	–
Sharp 9400, 9460, 9600 9700E	–	–	89	149	–	–	249	–	–	–	–	–
TI XL/PS17/PS35	–	–	55	–	–	–	–	–	–	–	–	–
TI Microlaser Pro E, Powerpro Pro 600	–	–	Call	Call	–	–	Call	–	–	Call	–	–
TI Microwriter			79	159	–	–	–	–	–	–	–	–

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Please answer questions below:

1. Where do you use your computer? (Check one only):
   A. ☐ Home B. ☐ Business C. ☐ Both
2. What kinds of computers do you use? (Check all that apply):
   D. ☐ IBM/Compatible Laptop E. ☐ IBM/Compatible Desktop F. ☐ MAC
3. Do you plan to buy any of the hardware or software mentioned below in the next 12 months? (Check all that apply):

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G. ☐ PC
H. ☐ MAC
I. ☐ Laptop
J. ☐ Printer
K. ☐ Monitor
L. ☐ Disk/Tape Back-up
M. ☐ Add-in Board
N. ☐ Modem
O. ☐ Input Device
P. ☐ Local Area Network

SOFTWARE
Q. ☐ Accounting
R. ☐ Spreadsheet
S. ☐ Personal Finance
T. ☐ Desktop Publishing
U. ☐ Word Processor
V. ☐ Database Manager
W. ☐ Graphics
X. ☐ Utility
Y. ☐ Communications
Z. ☐ Windows/Multi-tasking
1. ☐ Programming Language/ Compiler
2. ☐ Integrated/Multifunction
3. ☐ CAD
4. ☐ CD-ROM

4. From which of the following sources do you purchase personal computer products? (Check all that apply):
   5. ☐ Specialty Computer Retail Stores 7. ☐ Direct from Manufacturers
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Circle the numbers below corresponding to products featured in this issue's advertisements and listed in the Editorial Product Index. Manufacturers will mail product literature to you free of charge.

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V. ☐ Database Manager
W. ☐ Graphics
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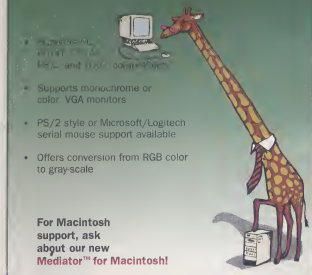

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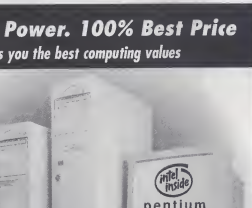

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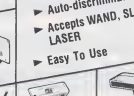

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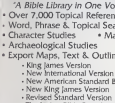

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A recent study of *PC Computing* subscribers reports that 88% of *PC Computing* subscribers were using Windows.

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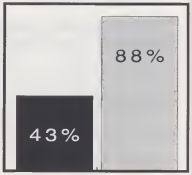

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2Market / 2Market / (800) 622-6600 / $19.95 per subscription / *Reader Service No. 822*

Web Word

By mid-1995, Microsoft expects to ship Internet Assistant for Word, an HTML add-in that turns Word into a World Wide Web browser/editor.

THE NET ADVANTAGE

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When you think of the relationship between business and the U.S. government, you probably think of bureaucracy, regulations, and, of course, taxes. But don't overlook a key element: information. Government information amounts to more than 10 million documents, reports, studies, and databases—and the pile keeps growing. And the best way to navigate this sea of documents is with the National Technical Information Service (NTIS).

The NTIS, an agency of the U.S. Department of Commerce, adds an average of 1,300 new titles to its collection each week, covering everything from management studies to oceanic technology. If it's unclassified government information, you can find it here.

NTIS includes FedWorld, which links to all government Web pages; the Bibliographic Database; Alerts, a customizable news service; Federal Research in Progress, which keeps you current on ongoing projects; Promotional Materials, including documents and software; and Foreign Broadcast Information, which includes political and economic briefings.

Considering a franchise purchase? Scan demographic information about the surrounding neighborhoods from the 1990 U.S. Census. Think you've developed the latest and greatest widget? Check the U.S. Patent and Trade Office first. Working on an import plan involving the Pacific Rim? NTIS offers a wealth of information on doing business in Japan.

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Window on the White House: Find the latest on Socks, Chelsea, and 10 million federal documents via NTIS.

ONE-MINUTE GUIDE The Great Web Chase: What's Your Quest?

You wouldn't run a warehouse without inventory procedures, but the Web, an enormous data repository, does. Search difficulties? Try these top tools:

WEBCRAWLER Type keyword(s), select the number of hits you want (35, 100, or all).
http://www.biotech.washington.edu/WebCrawler/WebQuery.html

OPEN MARKET Open Market's Commercial Sites Index lists specific services, products, and businesses.
http://www.directory.net/

MONSTER FTP LIST If you can FTP it, it's probably listed here.
http://hoohoo.ncsa.uiuc.edu:80/ftp-interface.html

YAHOO Case-sensitive Boolean searches.
http://akebono.stanford.edu/yahoo/bin/menu?186,8

EINET GALAXY Keywords by topic.
http://www.einet.net/galaxy.html

NEW INTERNET RESOURCE KNOWLEDGE SYSTEM (NIKOS) Intelligent Web indexing.
http://www.rns.com/cgi-bin/nomad

HARVEST Software for locating Net data.
http://harvest.cs.colorado.edu

JUMPSTATION Like WebCrawler, it lets you search using keywords.
http://www.stir.ac.uk/jsbin/js?search

WWW WORM 1994's best navigator.
http://www.cs.colorado.edu/home/mcbryan/WWWW.html

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I-Way Patrol

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http://www.nando.net/pctravel.html

PRODIGIOUS WEB BUSINESS AstraNet, Prodigy's new Web home page, includes news, sports, government, and business information; Prodigy membership optional.
http://www.astranet.com/

LET'S GET TECHNICAL From computing to physics to microbiology, two of the best technical home pages, Caltech and MIT, have it all.
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http://www.web.mit.edu/

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http://att.net/dir800

THE TAX MAN COMETH Your friendly IRS office provides tax forms, filing information, and other essentials.
http://www.ustreas.gov/treasury/bureaus/irs/irs.html

TAKE A HIKE AOL and Boken have launched Outdoor Adventure Online; access profiles of national and state parks, dive sites, ski resorts, and more.
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Job Interview Simulator *****
Job Hunting? You're Hired asks common interview questions, records elapsed answer times, and more.
Filename: hired.zip **Site:** ftp://ftp.garbo.uwasa.fi/ **Size/Time*:** 1MB/26:00

Business Research ***
Thinking of incorporating? Company Corporation offers free advice outlining the pros and cons.
Filename: corprate.zip **Site:** gopher://gopher.incorporate.com **Size/Time*:** 20K/0:30

Internet Guide Book *****
If you have only one Internet-related book, Brendan Kehoe's *Zen and the Art of the Internet* is it.
Filename: netzen.zip **Site:** ftp://ftp.cs.widener.edu (pub/zen) **Size/Time*:** 1.1MB/30:00

Travel Advisories ****
Planning to travel abroad? Read and heed State Department and Consular Affairs warnings first.
Filename: travel.zip **Site:** gopher://gopher.info.umd.edu/ **Size/Time*:** 1MB/26:00

Smithsonian Collections ****
No need to go to Washington to stroll through the Smithsonian's art and artifacts.
Filename: chapman.zip **Site:** ftp://ftp.sunsite.unc.edu/ **Size/Time*:** 70K/1:28

Pacific Rim Business ***
Competing in emerging Asian markets? Business tips from the David See-Chai Lam Center.
Filename: davidlam.zip **Site:** gopher://gopher.hoshi.cic.sfu.ca **Size/Time*:** 24K/0:42

Videotape Database *****
Videophiles: Movie Catalog for Windows organizes your massive VHS tape collection.
Filename: am_mc10.zip **Site:** ftp://ftp.garbo.uwasa.fi/ **Size/Time*:** 98K/2:10

Global Area Codes ***
Dialing internationally? Here's a database of all global area codes, from Argentina to Zimbabwe.
Filename: worldphn.zip **Site:** gopher://gopher.aecom.yu.edu **Size/Time*:** 80K/1:40

I/O Utilities ***
A dozen sophisticated I/O utilities for managing and monitoring COM, parallel, and serial ports.
Filename: ioiutils.zip **Site:** ftp://ftp.oak.oakland.edu **Size/Time*:** 2MB/35:00

Nutritional Tips ****
Are you eating right? Eat Right dispenses vitamin facts, calorie information, and dietary advice.
Filename: eatrite.zip **Site:** telnet fedworld.gov (NFCCAL.TXT) **Size/Time*:** 50K/1:19

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Check out a dozen shareware and freeware modem utilities, technical references, and protocol discussions in one tight bundle. Mostly DOS, some Windows, all useful.
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PC Contact, data library 3
eatup.zip
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ZiffNet users pay a monthly membership fee of $2.95. This support fee provides a variety of free and chargeable services. For the latest information about these services, type GO ZNT:ZIFFHELP and download the files GOWORD.TXT and FREE.TXT from data library 1 (General Information).

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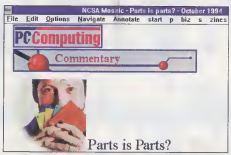
3. Dial the access number with a modem. When it connects to the network, press Ctrl–C to get the system's attention.
4. At the HOST NAME prompt, type CIS and press Enter.
5. At the USER ID prompt, type 177000,5300 and press Enter.
6. At the PASSWORD prompt, type PC/CONTACT and press Enter.
7. At the ENTER AGREEMENT NUMBER prompt, type PCC95 and press Enter.



Bott's on the Web: Visit PC Computing Web Edition and catch up with the latest features, reviews, commentary, and columns, including the latest inside information from Senior Contributing Editor Ed Bott. http://www.pc-computing.ziff.com/~pccomp.

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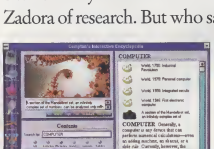
PC Computing

CD-RONWhite

Reference Points

In high school, the papers you researched using encyclopedias got A's. On CD-ROM, encyclopedias are even better. Sound, animation, and video beat thumbing through the *Readers' Guide to Periodical Literature.* OK, so if you cited one in your doctoral thesis, you'd be disdained as the Pia Zadora of research. But who says you can't learn just for fun?



Want Help? Simply click on the talking pinhead on the status bar.

COMPTON'S INTERACTIVE ENCYCLOPEDIA ●●●●

You want facts *and* polish? Use Compton's Interactive Encyclopedia 1995. Its Idea Search scours the disc's 35,000 articles for variations on a theme. If that doesn't appeal to you, the Info Pilot leads you serendipitously from Margaret Bourke-White to transcendentalism. With interface choices like *newsrooms* or *spaceships,* you can click on objects to get to the facts—or have Patrick Stewart beam in for a guided tour. And in the Editing Room, students can piece together multimedia show-and-tells.

Why only a four-disc rating? Its MIDI tracks sound like a wind-up toy on many sound cards, and the slow-drawing maps lack detail. Otherwise, it's a pleasure.

Compton's Interactive Encyclopedia 1995 / Compton's NewMedia / (800) 862-2206 / $80 est. street price / *Reader Service No. 831*

THE 1995 GROLIER MULTIMEDIA ENCYCLOPEDIA ●●●

This version of the Grolier Multimedia Encyclopedia has more videos and animation than ever before, as well as clever touches such as Pathmakers—grainy video interviews with people like Buzz Aldrin discussing exploration and Kurt Vonnegut Jr. discussing the novel. They join the Knowledge Explorers, which are multimedia essays on broad topics such as architecture, world history, the human body, and technology.

For those who read, Grolier's information is substantial. However, it has some dubious access routes. The time line and toolbar are great for photos, videos, or maps. But within the text you can't use the keys to scroll; you have to use the mouse. More curious is "related concept searching," which adds irrelevancies to a normal topic search. For example, a simple search of the Beatles gets Buddy Holly and Joe Cocker, which makes sense. But Walter Matthau (from his role in *Buddy, Buddy,* as in Buddy Holly), cocker spaniels (because of Joe Cocker), and management science and animal experimentation? Why? Search me. In an age of information overload, this just adds more superfluous facts to the heap.

It Groliers on You: Color and cool info—is this really an encyclopedia?

The 1995 Grolier Multimedia Encyclopedia / Grolier Electronic Publishing / (800) 285-4534 / $99.95 est. street price / *Reader Service No. 832*

BRITANNICA CD ●●●●

Back in my college days, there was only one encyclopedia you'd dare to cite in your reports—the *Encyclopedia Britannica.* To this day it remains the most authoritative and respected printed encyclopedia. Now the complete text—82,000 articles and 16 million references, plus the complete *Merriam-Webster's Collegiate Dictionary* of 70,000 definitions—is available on one CD-ROM as Britannica CD. You won't find a more thorough reference on disc.

The Windows version is as unfrilly as the printed version. In fact, the early version I reviewed didn't have even the relatively few illustrations of the hard-copy edition. (By the time you read this, however, a new illustrated and speed-enhanced CD version will be available.) But searches are fast and the list of articles that match a search item are scored for relevance.

One source of real irritation accompanies the Britannica CD—a copy protection dongle that plugs into a parallel port, without which you can't spin the disc. But when a CD-ROM costs nearly $1,000, you can expect a publisher to get a bit paranoid.

Britannica CD / Encyclopedia Britannica / (800) 323-1229 / $995 list ($495 with purchase of printed edition) / *Reader Service No. 833*

●●●●● *Teacher's pet.* ●●●● *Head of the class.* ●●● *Dumb but popular with all the cool kids.* ●● *Sleeps through study hall.* ● *Straight to the principal's office!*

PHOTOGRAPH BY JAMES McCOON

CD-RONWhite

WEBSTER'S INTERACTIVE ENCYCLOPEDIA ○○

The best thing about this British import Windows CD is that the audio help is spoken by an Englishwoman, which makes you feel cultured even when you aren't learning a thing. Webster's Interactive Encyclopedia would make great reading for a multimedia PC in your bathroom. Every item in this *USA Today* of encyclopedias is short. And the multimedia, while copious, is hard to find. The best thing about the interface is its clear, logical Boolean search window. But that nice touch is canceled out because the disc tells you how many articles matched the search but doesn't display them. You have to then ask it to display the list—handy if you just want to count articles without going to the trouble of actually learning anything.

Webster's Interactive Encyclopedia / Cambrix Publishing / (800) 992-8781, (818) 992-8484 / $39 est. street price / *Reader Service No. 834*

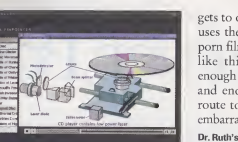
DRI/MCGRAW-HILL ENCYCLOPEDIA OF WORLD ECONOMIES ○○

It used to be that the McGraw-Hill Multimedia Encyclopedia of Science and Technology was my favorite dweeb's CD. But this CD-ROM is even dweebier. It's only in DOS; there's no multimedia; it uses color so sparingly that it might as well be monochrome; it barely knows how to use a mouse; and it's nothing but statistics, statistics, statistics. Don't get me wrong. I know there are people for whom it's very important to find out that the 1993 monthly wage in Albania was $83 (up from a low of $39 in 1991). The CD is chock full of economics info, and for people who live on that type of data, this disc is surely a godsend. I just don't want any of them to corner me at a party.

DRI/McGraw-Hill Encyclopedia of World Economics on CD-ROM / McGraw-Hill / (800) 262-4729 / $345 list / *Reader Service No. 835*

MICROSOFT ENCARTA '95 ○○○

Microsoft Encarta '95 has an interface as slick as anything this side of a St. Louis card shark—and at times just as bewildering. Oh, it's pretty, all right.



Encartloads of Multimedia: Big on photos and animations, small on info.

There's hardly a page of text that isn't accompanied by exemplary multimedia: 6,500 photos, 100 videos, 83 animations, and hundreds of maps, graphs, and sound bites. It's fun to browse through, but if you're looking for something specific for that term paper due tomorrow, the ride is rough. So many menus and icons pop out from every direction that Encarta seems to be saying it has nothing to match what you're looking for even though you know it damn well does—you saw it just three program crashes ago. (I should point out that Encarta freezes up frequently and gobbles system resources. If Microsoft ever faces an antitrust suit alleging its application group gets secret help from the OS programmers, the company lawyers can use this disc as proof positive that it doesn't.)

Sometimes it's possible to be too pretty. Microsoft Encarta '95 needs more information and less interface.

Microsoft Encarta '95 / Microsoft Home / (800) 426-9400, (206) 882-8080 / $99.95 est. street price / *Reader Service No. 836*

DR. RUTH'S ENCYCLOPEDIA OF SEX ○○○

Sooner or later you want to get down and dirty, and Dr. Ruth's Encyclopedia of Sex is the Windows CD-ROM to do it with. Ruth Westheimer, everyone's favorite cheery sex gnome, chats blithely about body parts, positions, and devices that don't get reviewed in computer magazines.

There are visuals on the disc, but don't get too excited: The videos are tasteful, while the grittier topics are reserved for animations, Victorian drawings, and art from the *Kama Sutra*. The closest this gets to one of *those* CD-ROMs is that it uses the same kind of cheesy music as porn films. It's easy to joke about a disc like this, but it's serious stuff, with enough clinical detail to be educational and enough design smarts to ease the route to the information you were too embarrassed to ask for.

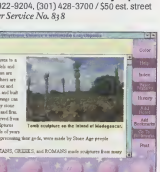
Dr. Ruth's Encyclopedia of Sex / Creative Multimedia / (800) 262-7668, (503) 241-4351 / $29.99 est. street price / *Reader Service No. 837*

HEINEMANN CHILDREN'S MULTIMEDIA ○○

You expect a children's encyclopedia to be simple, right? That pretty much describes Heinemann Children's Multimedia Encyclopedia. The text is short, and the navigation interface is within a second-grader's grasp. But there's precious little *Sesame Street* pizzazz to hook those short attention spans—and what else is multimedia in children's titles good for?

Well, there is some sparkle, just not enough. In the section on television and movies, wouldn't you expect some footage from a movie? I would. But Heinemann evidently had other ideas on the issue. There are several videos and animations in this Windows program, but many lack narration, and those that have it use children's voices—a nice idea, but the young, untrained voices have you thinking that they're saying cockroaches are found as "pets" in homes, instead of "pests." If your kid is the nerd all the other kids make fun of, spinning this Windows CD is better than playing alone.

Heinemann Children's Multimedia Encyclopedia / RTIS / (800) 922-9204, (301) 428-3700 / $50 est. street price / *Reader Service No. 838*



Kids' Stuff: Heinemann's reference looks good, but it lacks punch.

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A P-51 costs $500,000 and burns $100 of fuel an hour. For $50 down and $3 an hour, you can be flight-and-fight simulating against other Walter Mitty pilots. It's the best return on your investment—and your loved ones won't have to inter your remains if you get shot down online.

PHOTOGRAPHY BY ERNIE FRIEDLANDER

Crunching, Kick Back and Smoke Simulated Pilots Online . . .

Get Online: Kesmai's SVGA Air Warrior (onscreen) dominates multiplayer flight simulation on GEnie. With up to eight players staffing B-17 missions, all other games pale by comparison.

SVGA Air Warrior / Kesmai / (800) 426-3836 / $50 est. street price / *Reader Service No. 666*

GEnie / (800) 638-9636 / $8.95 per month, $6 per hour at 9,600 bps / *Reader Service No. 667*

Macho Hardware: With Dell's Dimension XPS 466V on your desk, you're halfway home to the ultimate PC flight simulator. Add a Diamond Viper VL-Bus video card and a 14.4Kbps U.S. Robotics modem (lower left). Round it off with the Phoenix Flight & Weapons Control system, an eight-button joystick and control panel (left).

Dimension XPS 466V / Dell / (800) 289-3355, (512) 338-4400 / from $1,599 est. street price / *Reader Service No. 668*

Viper SE / Diamond Multimedia Systems / (408) 736-2000 / $330 est. street price / *Reader Service No. 669*

Sportster 14.4 / U.S. Robotics / (800) 877-2677 / $129 est. street price / *Reader Service No. 670*

Phoenix Flight & Weapons Control System / Advanced Gravis / (800) 663-8558 / $99 est. street price / *Reader Service No. 671*

Virtual von Richthofen: Red Baron, either stand-alone or interactive (insets) on The ImagiNation Network, makes for an easy four-pilot battle. But at between $3 and $5 an hour, you'd better find an opponent and a free arena fast.

Red Baron / Dynamix / (800) 757-7707 / $34.95 est. street price / *Reader Service No. 672*

The ImagiNation Network / (800) 462-4461 / $9.95 for 5-hour usage, plus $3.50 an hour / *Reader Service No. 673*

BY JOHN G. NOLAN AND ROBERT J. NOLAN

Technolust

On the Other End of the Phone Wire, Your Opponent Is Waiting,

Bombs Away! PCs have discovered what the TV industry knew decades ago: Sounds and pictures go together. Hear your Stealth bomber drop the big one through Nokia's ValueGraph 447L monitor and speaker combo (left). And take your fighter to the max with the WingMan Extreme control column (right), complete with its array of programmable buttons. And if a button-filled joystick isn't enough, add ThrustMaster's Rudder Control System (not shown) for extra maneuverability.

ValueGraph 447L / Nokia / (415) 331-0322 / $600 est. street price / *Reader Service No. 674*

WingMan Extreme / Logitech / (800) 231-7717 / $49 est. street price / *Reader Service No. 675*

Rudder Control System / ThrustMaster / (503) 639-3200 / $120 est. street price / *Reader Service No. 676*

Stealth and Simulation: The F-117A Stealth Fighter and Lockheed F-22 Superstar planes in Ocean of America's TFX: Tactical Fighter Experiment look great. Pull Gs and they even *sound* great. But the screens are as dark as a Batman movie (inset, right), and the documentation is short—so be warned.

And if you're sick of battle, try Microsoft's Flight Simulator 5.0 (left)—especially if you're thinking about getting a pilot's license. The graphics are excellent, the flight model accurate, and no killing is necessary—or for that matter, possible. It's PG-rated.

TFX: Tactical Fighter Experiment / Ocean of America / (408) 289-1411 / $39 est. street price / *Reader Service No. 677*

Flight Simulator 5.0 / Microsoft / (800) 426-9400, (206) 882-8080 / $39.95 est. street price / *Reader Service No. 678*

Ed Bott

The Unlearning Curve

The official story: *The Microsoft Windows 95 Reviewers Guide* says, "New User Interface. A blizzard of improvements greatly enhance learnability, usability, and efficiency for users of all levels of expertise. New users can get started more quickly, and experienced users can fully unlock the power of their PCs."

The Inside Story Yes, Windows 95 will be nirvana for novices. There's a learning curve, but Windows newbies will get over it a lot quicker than they did with Windows 3.1. Once you've trained a PC-phobe to right-click anytime he or she gets confused, you'll get far fewer "What do I do now?" calls. But what about the rest of us? For experienced Windows users, the unlearning curve is the biggest hurdle. Microsoft says its usability tests prove that newbies and power users alike are more productive after only 20 minutes with the Windows 95 UI. Maybe. When I first began using Windows 95 as my day-in-and-day-out operating system, though, my productivity dropped to near-zero for the first week as I searched for the Win95 equivalents of all the hard-earned Win31 shortcuts and workarounds programmed into my fingers.

Don't get me wrong: Doing away with File Manager, Program Manager, INI files, and all the baggage of MS-DOS is a good thing. But be ready for a few disorienting and time-wasting experiences.

Have you memorized every obscure setting for every undocumented line in SYSTEM.INI and WIN.INI? Unlearn it all. Those two files are still around, but strictly for compatibility purposes. All the stuff that counts has been migrated to the Windows 95 Registry, a massive data store that documents every detail of every peripheral, program, and preference in your system. Maybe, for example, in honor of the previous occupant of this space, you've decided to give the dopey My Computer icon a more interesting name, like Uma Thurman. Win95 stashes that factoid in the Registry along with My Computer's *real* name, which is actually 32 bits of digital nonsense like 20D04FE0-3AEA-1069-A2D8-08002B30309D.

Microsoft says that everything you need to do with the Registry can be done with a Control Panel applet or property setting, complete with a friendly GUI. Don't believe it. You *will* want to do things that can be done only by hacking cryptic Registry entries like Hkey_Local_Machine\System\Current Control Set\Services\VxD\VNETSETUP. And to get there, you'll have to put on your coal-miner's hat and descend deep into the Registry, where you can fritter away days or weeks trying to figure out which entries do what. If you thought SYSTEM.INI was complicated, wait until you see the Registry.

My advice? Order the Windows 95 Resource Kit the same day you order your upgrade. And badger Microsoft if the Registry settings aren't completely documented.

I never thought I'd say it, but I miss File Manager already. Win95's Explorer is supposed to be File Manager on steroids. So why does it act like a 97-pound weakling?

- You can't easily compare the contents of two folders. Or move and copy files between them. With File Manager it's easy: Open two windows and then tile them. But Explorer doesn't do multiple windows. Opening a second instance of Explorer, and repositioning the two Explorers takes a minimum of five mouse clicks.
- You can't copy a floppy. Amazingly, Win95 doesn't have a GUI-based Diskcopy option. You'll have to fire up a DOS prompt to do it. It's a simple menu choice in the Windows 3.1 File Manager. Oh, and if you want to copy one of the disks that Windows 95 arrives on, you'll need to find a utility that understands the new 1.6MB DMF format. Explorer doesn't do DMF.
- You can't customize toolbars. You want to put your favorite command on the Explorer toolbar? Tough. The guys on the MS Office team could add this feature in a half-day. But we'll probably have to wait for Peter Norton to do it.

There's plenty more to dislike about the Explorer, but you get the idea.

The moral? The more you know about Windows, the more you're likely to have to unlearn when you upgrade. Don't underestimate the cost in time or brain cells.

When Will You Be Able to Buy Windows 95? It's June! Oh, wait. It's August! Um, we know for sure that it's probably still sometime in 1995. Probably. The smart money says August 10.

PHOTOGRAPH BY JAMES McGOON

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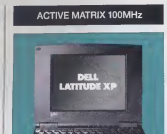

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